

# A Paradox of Spontaneous Formation: The Evolution of Private Legal Systems

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*Scholarship on private legal systems (PLSs) explains the evolution of norms created and enforced by PLSs but rarely addresses the evolution of institutions that form PLSs. Such institutions are assumed to form spontaneously (unless suppressed by law) when law fails, neglects, or chooses not to direct behavior in a welfare-maximizing manner.*

*But, as this Article demonstrates, PLSs typically cannot form spontaneously. Newly formed PLSs cannot enforce cooperation since the effectiveness of mechanisms used to secure this cooperation (e.g., the threat of exclusion) depends on the PLSs' ability to confer benefits on their members, and newly-formed PLSs do not yet confer such benefits.*

*Successful PLSs bypass this barrier by building on extant foundations—preexisting institutions that already benefit members, typically by regulating norms that are not very costly to enforce. The threat of losing these benefits disciplines members to abide by the PLSs' rules, thus permitting PLSs to regulate behavior. This pattern indicates that rather than developing spontaneously, PLSs develop in phases, initially facilitating activities that are unrelated to regulating behavior and incurring low enforcement costs; the enforcement of these norms enables the PLS to regulate behavior at a later stage (or stages).*

*The Article thus focuses not on the efficiency of the norm but on the efficiency of the enforcement mechanism that regulates the norm and suggests the pattern by which PLSs evolve to become effective enforcement mechanisms. It then suggests normative applications in the fields of antitrust, critical infrastructure protection, and corporate governance.*

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## I. INTRODUCTION: PAX DEI AS A PARABLE

Life in Western Europe of the late tenth century was, for most of its inhabitants, dismal and unsafe. The decline of the Carolingian Empire created a political vacuum and intensified the decentralizing forces that had plagued the Empire since its inception. Throughout the region, independent warlords consolidated power through private warfare, unhindered by the ineffective central government.<sup>1</sup> Peasants were among the main victims of this warfare, since it was far more difficult for the warlords to breach a fortified stronghold than to starve it out by destroying the surrounding fields.

Mutual destruction of farms was an unattractive result even to a heartless warlord, but destroying the other's farms was the most rational action for each warlord to undertake: if one warlord expected his rival to show mercy to the warlord's peasants, then attacking the rival's peasants would bring a quick and decisive victory. And if a warlord expected his rival to show no mercy to the warlord's peasants, then the warlord's only chance was to preemptively strike the rival's peasants.

In some situations, this gloomy outcome could have been averted either through intervention by a third party capable of enforcing its will on the opposing parties, or by a warlord's exercise of self-restraint in order to garner a reputation for fairness. Such a reputation could benefit the warlord in future encounters with the same rival and in encounters with others who had learned of the magnanimous party's reputation. But in West Frankland of the tenth century, central government was too weak to assume the role of third-party enforcer, and a reputation for benevolence was of little use; a warlord whose mercy was taken advantage of, even once, would likely die, precluding his receipt of any future benefit from the benevolent reputation.

This bleak dynamic of mutual destruction was halted, however, by a unique institution that surfaced in response to the situation: Pax Dei (Latin for "Peace of God"), one of the world's first decentralized, popular peace movements. The movement created rules to regulate warfare, prohibiting a combatant from harming non-combatants, suspending warfare during the harvest season and during times of religious significance (e.g., Lent and the Sabbath).

These rules were not promulgated by a king or parliament. Rather, they were voluntarily undertaken by the warlords, who swore oaths before large crowds of commoners to abide by the rules. These crowds gathered around saints' relics, on which the warlords typically swore their commitments. The

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1. On the Pax Dei movement and conditions in Western Europe at the time of the movement's birth, see *THE PEACE OF GOD: SOCIAL VIOLENCE AND RELIGIOUS RESPONSE IN FRANCE AROUND THE YEAR 1000* (Thomas F. Head & Richard Landes, eds. 1992); and see also *Peace of God: Pax Dei*, at <http://www.mille.org/people/rfpages/paxdei.html> (last visited Oct. 7, 2003).

enthusiasm and religious fervor driving this movement were great. A chronicler of that time, Ralph Glaber, describes one such gathering:

At this all were inflamed with such ardour that through the hands of their bishops they raised the pastoral staff to heaven, while themselves with outspread palms and with one voice cried to God: Peace, peace, peace!—that this might be a sign of perpetual covenant for that which they had promised between themselves and God.<sup>2</sup>

Though the warlords participated voluntarily in the movement, they did not necessarily desire to do so. Some, perhaps, were willing to refrain from destroying others' farms provided their rivals would likewise refrain from destroying theirs. Other, more ambitious warlords were driven to participate by fear of crossing both the large, enthusiastic crowds and divine will. Unlike governmental decrees, which are typically backed by a strong centralized institution, the oaths were not enforced by a force stronger than the violating warlords. In this fragmented region, such a force did not exist. Rather, the oaths were enforced by the diffuse threat of social and religious ostracism.

The Pax Dei movement provides a colorful example of the formation of a PLS (also known as a "private ordering")—a non-governmental institution intended to regulate the behavior of its members.<sup>3</sup> It also offers a good starting point for examining how PLSs evolve. Pax Dei formed around a religious, mystical social network that centered on the belief that the peace oaths were covenants with God. Why did Pax Dei require the aid of religion, rather than spontaneously forming among the people in response to a need for order to which government could not respond?<sup>4</sup> Is there a pattern that can help us predict what institutions will regulate behavior and facilitate PLSs? This

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2. Ralph Glaber, *Miracles de Saint-Benoit*, at <http://www.fordham.edu/halsall/source/glaber-1000.html> (last visited Oct. 7, 2003).

3. Though usually discernable, the dichotomy between public and private legal systems is not always a clear one. Some PLSs have a significant public backing and are very similar to public legal systems. For example, the King of England enacted in 1353 the "Statute of the Staple," which prohibited common law courts from hearing disputes arising from contracts made on the staple markets (markets for important commodities, such as wool). Instead, the statute created Staple Courts and instructed them to apply the (privately formed) law merchant. Thus, private law was given exclusive jurisdiction by public decree. See Todd J. Zywicki, *The Rise and Fall of Efficiency in the Common Law: A Supply-Side Analysis*, 97 NW. U. L. REV. 1551, 1598-99 (2003).

Conversely, some public legal fora defer to private ordering (e.g., arbitration proceedings), and some public legal fora compete with other legal fora, and thus act more like PLSs. For example, the common law developed in England from the rulings of judges of the Court of King's Bench. For centuries this court had competed with several other royal courts (notably the Court of the Exchequer and the Court of Common Pleas), the ecclesiastical courts, town and feudal courts, and merchant courts. *Id.* at 31-38. Though the courts had, in theory, limits to their jurisdictions, they each used legal fictions to expand their reach. *Id.* As Adam Smith noted, this led to improved quality and impartiality of judicial decisions. ADAM SMITH, AN INQUIRY INTO THE NATURE AND CAUSES OF THE WEALTH OF NATIONS, 241-42 (Edwin Cannan ed., 1976) (1776).

4. For example, the peasants could collectively pay the warlords to spare them. Better yet, they could intimidate the warlords by threatening that an attack on any peasant would result in violent retaliation by all peasants, who, though less well-armed and trained, were large enough in number to overwhelm the warlord's companions. This would require coordination between the peasants, but so did Pax Dei.

Article will suggest such a pattern.

PLSs are institutions that form and enforce norms.<sup>5</sup> They either replace or complement an extant public legal system (“the law”). PLSs can take a multitude of forms. They may be as simple as a contract between two parties, assigning rights and duties differently from the default set by public law. Or they may be elaborate and rely on private courts; *lex mercatoria*, the PLS that developed in the Middle Ages to govern long-distance trade, is one example of this sort of PLS.<sup>6</sup> They may be dictated by those at the top of a hierarchy, such as internal rules of a company. And they may also take a more subtle form, such as the system of social norms that leads most of us to stand in a queue, to be polite to strangers, or to yield to an anonymous driver who is trying to switch lanes on a highway.

Though PLSs can (and do) take many different forms, most PLSs that govern large numbers of people are facilitated by networks. Networks are collections of facilities and rules that facilitate contact between users of a good or service (“network members”) and thus enable the realization of network effects. Network effects (or network benefits) are demand-side economies of scale. That is, network effects are the phenomena that occur when the utility<sup>7</sup> of a good or service to an individual user increases as additional people use it.

Networks benefit their members by enforcing norms that facilitate a variety of activities, such as social interaction, spiritual support, and the opportunity to exchange goods. For reasons that will be addressed later in this Article,

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5. Scholars offer a variety of definitions of the term “norms.” See, e.g., Robert D. Cooter, *Decentralized Law for a Complex Economy: The Structural Approach to Adjudicating the New Law Merchant*, 144 U. PA. L. REV. 1643, 1656-57 (1996) (defining norms as obligations); Melvin A. Eisenberg, *Corporate Law and Social Norms*, 99 COLUM. L. REV. 1253, 1255 (1999) (defining norms as “all rules and regularities concerning human conduct, other than legal rules and organizational rules”); Richard H. McAdams, *The Origin, Development, and Regulation of Norms*, 96 MICH. L. REV. 338 (1997) (defining norms as “informal social regularities that individuals feel obligated to follow because of an internalized sense of duty, because of fear of external non-legal sanctions, or both”); Eric A. Posner, *Law, Economics, and Inefficient Norms*, 144 U. PA. L. REV. 1697, 1699-1701 (1996) (defining norms as rules that distinguish desirable from undesirable behaviors and give third parties the authority to punish those engaging in undesirable behaviors); Lior J. Strahilevitz, *Social Norms from Close-Knit Groups to Loose-Knit Groups*, 70 U. CHI. L. REV. 359, 363 n.24 (defining norms as “behavioral regularities that arise when humans are interacting with each other, regardless of whether that interaction is face-to-face”); Cass R. Sunstein, *Social Norms and Social Roles*, 96 COLUM. L. REV. 903, 914 (1996) (using a rough definition of norms as “social attitudes of approval and disapproval, specifying what ought to be done and what ought not to be done”). Since the same norm could potentially be enforced by one of several regulators (i.e., norm enforcers) including government as well as private actors, it would not be sensible for this Article to employ a definition based on the identity of the regulator. Therefore, this Article will adopt a very broad definition of “norm” that includes all rules and regularities concerning human conduct (including legal and organizational rules).

6. On *lex mercatoria*, see, for example, Bruce L. Benson, *The Spontaneous Evolution of Commercial Law*, 55 S. ECON. J. 644 (1989).

7. The terms “utility” and “benefit” from an action measure the satisfaction of an individual’s (or a group’s) preferences as a result of the action. Satisfaction is affected by receiving goods, services or experiences (e.g., money, other material benefits, spiritual elation, a sense of being loved, etc.). Utility can also be negative, when an action results in dissatisfaction (e.g., loss or devaluation of material possessions, a sense of rejection, exploitation, etc.).

networks are often well-suited to regulating behavior (i.e., enforcing norms), because they efficiently employ certain enforcement mechanisms.<sup>8</sup> For this reason, networks often facilitate PLSs. As I will explain, networks that enforce norms (i.e., PLSs) are usually effective in doing so because they already enforce other, preexisting norms for their members.

While the private ordering literature examines PLSs and tracks the evolution of norms that are created and enforced by these systems,<sup>9</sup> it pays scant attention to how the institutions themselves evolved to become PLSs. Perhaps drawing on the Coase Theorem and assuming negligible transaction costs,<sup>10</sup> and perhaps expanding on Friedrich Hayek's theory of spontaneous order,<sup>11</sup> most of the literature presupposes that PLSs emerge spontaneously in response to a governance need unfulfilled by government.<sup>12</sup> Even the private ordering literature that explicitly recognizes the high transaction costs borne by a PLS in enforcing norms focuses (with rare exceptions) not on the effects of these costs on the evolution of institutions but on what institutions eventually evolved.<sup>13</sup>

This Article attempts to contribute to filling this gap by suggesting a theory of how (and which) institutions evolve into PLSs. PLSs typically do not form spontaneously but build on existing institutional infrastructure: networks that originally facilitated low-enforcement-cost norms (i.e., norms that do not require coercion to effect compliance). PLSs that lack this preexisting functionality are likely to be ineffective in enforcing norms (except in rare

8. See *infra* Section II.A. For a more in-depth examination of the advantages networks have in facilitating PLSs, and the circumstances in which these advantages are significant, see Amitai Aviram, *Regulation by Networks*, *BYU L. REV.* (forthcoming 2003) (on file with author).

9. See, e.g., ROBERT C. ELLICKSON, *ORDER WITHOUT LAW: HOW NEIGHBORS SETTLE DISPUTES* (1991) [hereinafter *ORDER WITHOUT LAW*]; Lisa Bernstein, *Opting Out of the Legal System: Extralegal Contractual Relations in the Diamond Industry*, 21 *J. LEGAL STUD.* 115 (1992); Karen Clay, *Trade Without Law: Private-Order Institutions in Mexican California*, 13 *J.L. ECON. & ORG.* 202 (1997); Robert C. Ellickson, *A Hypothesis of Wealth-Maximizing Norms: Evidence from the Whaling Industry*, 5 *J.L. ECON. & ORG.* 83 (1989); Avner Greif, *Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition*, 83 *AM. ECON. REV.* 525 (1993); Curtis J. Milhaupt & Mark D. West, *The Dark Side of Private Ordering: An Institutional and Empirical Analysis of Organized Crime*, 67 *U. CHI. L. REV.* 41 (2000); David G. Oedel, *Private Interbank Discipline*, 16 *HARV. J.L. & PUB. POL'Y* 327 (1993).

10. On the Coase Theorem and its relation to PLSs, see the discussion *infra* Section II.A.

11. See 1-3 FRIEDRICH A. HAYEK, *LAW, LEGISLATION & LIBERTY* (1973).

12. The term "spontaneous formation" of a PLS may be ambiguous. By "spontaneous formation" I refer to the creation of a PLS without reliance on a preexisting foundation. In this Article I claim that this pattern of PLS formation is rare. Some of the literature uses the term "spontaneous formation" of private ordering to denote an evolution that is decentralized or private (i.e., not dictated by a government). See Benson, *supra* note 6. I do not dispute that PLSs could evolve through decentralized processes.

13. See, e.g., Robert C. Ellickson, *Of Coase and Cattle: Dispute Resolution Among Neighbors in Shasta County*, 38 *STAN. L. REV.* 623 (1986); Robert C. Ellickson & Charles D. Thorland, *Ancient Land Law: Mesopotamia, Egypt, Israel*, 71 *CHI.-KENT L. REV.* 321, 324-27 (1995). But cf. Avner Greif et al., *Coordination, Commitment, and Enforcement: The Case of the Merchant Guild*, 102 *J. POL. ECON.* 745 (1994) (discussing the evolution of a specific institution that became a PLS—the merchant guild). Greif, Milgrom, and Weingast's contribution will be discussed below, see *infra* Section II.B.

situations where enforcing a norm requires very low enforcement costs) because of a “chicken and egg” paradox. This paradox, which I will refer to as the paradox of spontaneous formation, runs as follows: to direct behavior efficiently PLSs must ensure the cooperation of their members. But the effectiveness of the mechanisms used to secure this cooperation (e.g., the threat of exclusion) depends on PLSs’ ability to confer benefits to their members—primarily the ability, not yet existing in a spontaneously formed PLS, to direct behavior efficiently.

This paradox could, in theory, be resolved if there were an efficient bonding mechanism that assured the members of a spontaneous PLS (i.e., a newly formed system not based on a preexisting network)<sup>14</sup> of members’ mutual obedience to the rules. But, as I explain below, bonding of this sort is very expensive and its costs often outweigh the benefits conferred by the PLS. At the very least, enforcing a norm with a spontaneously formed PLS that overcomes the paradox through bonding is much more costly than enforcing the same norm by relying on a preexisting network that already enforces another norm among its members. Thus, in most cases, bonding is not a practical solution to the paradox of spontaneous formation.

To illustrate the way in which a PLS can rely on preexisting foundations, consider an alternate PLS that could have formed instead of Pax Dei. The peasants in a region could have convened and agreed to pool their resources to intimidate the warlords into undertaking peace oaths. This certainly would have benefited all of the peasants. However, each peasant faced the following predicament: if he supported this movement and others shirked, the movement would fail and he would be punished for his participation. A fledgling effort to support the movement would have no effect on the warlords and the likelihood of its success would be very uncertain. Given the danger of joining a movement that ultimately fails, and the initial high likelihood such a movement would fail, each peasant would be better off shirking than participating in a failed movement against the warlords. This predicament, which results in a failure of individuals to coordinate their behavior in a way that would enhance their welfare, is a collective action problem. The peasants could try to form bonds to assure each other of their mutual participation. If the movement only required the collaboration of a handful of peasants, perhaps each could offer collateral to assure the others of his participation. But this would be prohibitively expensive; the collaboration would require the participation of hundreds if not

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14. The term “spontaneously formed” PLS is used rather than “new” PLS because an existing network that has hitherto regulated a low-enforcement-cost norm (e.g., social interaction) and has now evolved to regulate another, higher enforcement-cost norm (e.g., restriction of warfare) would be a “new” PLS with respect to regulating the latter norm. However, the preexisting functionality is an important difference in the system’s ability to regulate, and therefore a term is needed to distinguish between a completely new (“spontaneously formed”) system and an existing system that begins to regulate a new norm.

thousands of impoverished peasants. Even if the cost of these bonds did not outweigh the benefits of the collaboration, this undoubtedly would be more expensive than the alternative—evolving an existing, religious social network into a PLS by adding to the norms it already enforced the regulation of warfare.

Consider the system that actually evolved. The Christian social network in Western Europe of that era provided its members with significant spiritual benefits, including a sense of belonging to a community and a sense of security derived from belief in divine oversight. Any person reneging on what was perceived to be a covenant with God would be excommunicated, losing the benefits religion provided. The ability to threaten exclusion from the religious group thus facilitated cooperation among even those members of the group who personally believed that breaking the peace oaths would not invite divine wrath (provided those members anticipated that the group would have excluded them for breaking the oaths).

This Article explores the effects of a network's preexisting functionality on its ability to evolve into a PLS. Differences in characteristics of norms already enforced by a PLS significantly affect the cost of its enforcing new norms. Key characteristics that affect enforcement costs are the benefits conferred by the network to the members (i.e., the importance to the members of the norms enforced by the network), the degree of divergence of these benefits among members, and the norms' "game types" (e.g., Prisoner's Dilemma, Battle of the Sexes, Stag Hunt, etc.). "Game types," in the context of this Article, refer to how members would rank each of the possible outcomes of their participation in a network.<sup>15</sup>

Since policing cartel agreements is a form of regulating behavior (within a specific, narrow scope of activity), many of the criteria that increase a network's ability to regulate behavior have been regarded in the antitrust literature as criteria that make cartels more stable.<sup>16</sup> This scholarship has not, however, examined the "game type" criterion, since cartel enforcement is almost always of the Prisoner's Dilemma type. This neglected criterion will be examined in depth in this Article.<sup>17</sup>

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15. This criterion will be explained in detail, and each of these games will be described below. See *infra* Part III.

16. See Andrew R. Dick, *When Are Cartels Stable Contracts?*, 39 J.L. & ECON. 241 (1996); George J. Stigler, *A Theory of Oligopoly*, 72 J. POL. ECON. 44 (1964).

17. Some of the private-ordering literature has made use of game-theoretic tools. However, these scholars have examined the game type of the newly-regulated norm, not that of the preexisting norm. For example, Ellickson examined a game type he termed "specialized labor," which would fit the payoff structure of two people having to decide whether to participate in building a fence, or shirking from this duty. See ORDER WITHOUT LAW, *supra* note 9, at 162-64. Ensuring an efficient participation in building a fence is among the behaviors the PLS (in Ellickson's case, the regional social network in Shasta County) attempts to regulate, not the preexisting norms (like a sense of community) it provided before regulating behavior. The evolutionary process of PLSs depends more on the game type of the latter, however. Typically, providing a sense of community is a Meeting Place game. See *infra* Section III.B.



The rest of this Article will introduce a method for analyzing the evolution of PLSs and apply this method to prominent case studies in the private ordering literature. Part II introduces a theory of how PLSs form and evolve. It reveals the flaws in the extant literature's implied assumption that PLSs form spontaneously.<sup>18</sup> It then explains, assisted by a model created by Greif, Milgrom, and Weingast,<sup>19</sup> why decentralized bonding cannot effectively enforce norms without reducing the volume of transactions to which the norm applies below the efficient level.<sup>20</sup> Finally, this Part examines the role of existing functionality of a PLS in lowering the costs of enforcing a new norm and proposes criteria to determine which networks have the lowest enforcement costs (and are thus likely to undertake to enforce norms that are relatively more expensive to enforce).<sup>21</sup>

After discussing these criteria, the Article will focus, in Part III, on one key criterion: the norms' game type. This section will offer a taxonomy of relevant game types (Harmony, Meeting Place, Battle of the Sexes, Stag Hunt, Chicken, Bully and Prisoner's Dilemma). Part IV will apply these tools by revisiting leading case studies in the literature on PLSs, and will note the pattern of each system's evolution, to the extent it can be gathered from those studies.

This literature—Ellickson's studies of cattle trespass,<sup>22</sup> Bernstein's examination of exchanges and trade associations,<sup>23</sup> Greif's<sup>24</sup> and Clay's<sup>25</sup> analysis of merchant coalitions, and other works—offers a rich variety of PLSs that evolved from networks of various game types. The methodology described in this Article will help to explain why, in each case, that specific network was the lowest-cost enforcer and therefore evolved into a PLS.

Besides shedding light on an aspect often neglected in the private ordering literature, this Article provides a foundation for normative analysis. Part V will suggest some possible applications of the Article's thesis in the fields of antitrust, critical infrastructure protection, and corporate governance, and will summarize the arguments advanced in this Article.

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18. See *infra* Section II.A.

19. Greif et al., *supra* note 13, at 751-52, 762-66.

20. See *infra* Section II.B.

21. See *infra* Section II.C.

22. ORDER WITHOUT LAW, *supra* note 9; Ellickson, *supra* note 13.

23. Bernstein, *supra* note 9; Lisa Bernstein, *Private Commercial Law in the Cotton Industry: Creating Cooperation Through Rules, Norms, and Institutions*, 99 MICH. L. REV. 1724 (2001).

24. Greif, *supra* note 9.

25. Clay, *supra* note 9.

## II. A THEORY OF THE EVOLUTION OF PRIVATE LEGAL SYSTEMS

A. *The Paradox of Spontaneous Formation*

Nobel laureate Ronald Coase anticipated a significant role for PLSs. In a world with no transaction costs, states one form of the Coase Theorem, parties would renegotiate inefficient entitlements granted by law to achieve an optimally efficient allocation.<sup>26</sup> For example, suppose that tort law imposes liability on a rancher whose cattle trespass onto a farmer's land. This rule may be inefficient in regions with many ranchers and very few farmers because it would be cheaper to fence out the few farms and have the cattle roam freely in the pasture than to fence in the cattle.<sup>27</sup> If transaction costs were negligible, having this inefficient rule would not result in an inefficient outcome. Instead, the ranchers would agree with the farmers to pay the farmers to fence themselves out, and the ranchers would let the cattle roam freely. This outcome would be feasible, since the cost for the ranchers to comply with the rule and fence their cattle in would be greater than the cost of fencing the farms in (which is why the rule was inefficient). As a result, the ranchers would be willing to bear the lesser cost of fencing out the farmers, plus a small premium to obtain the farmers' consent. The farmers, on the other hand, would agree to opt into the private regime in return for this small consent premium, since the private regime would not increase their exposure to trespass risk. Under the public (legal) regime, they would be compensated through tort law for the trespass; under the private regime the cattle would be fenced out, preventing the trespass from occurring.

In other words, in a world with no transaction costs, PLSs would form spontaneously through ad hoc contracting. Of course, no such world exists. There are costs to identifying an efficient regime and negotiating its terms among its stakeholders. When there are many ranchers and many farmers, there might be free riding, holdout problems, or other forms of strategic (or irrational) behavior that could prevent an efficient bargain from being reached. And, of course, there are enforcement costs incurred to ensure that the parties abide by the agreed terms. Enforcement costs become significant when parties perform their parts of the bargain non-simultaneously. They may also be significant if the public regime (i.e., the law) does not defer to the private regime (and instead allows parties to the private regime to opt out opportunistically by suing and receiving their entitlements under law at any time, even if they purported to contract those away).

Scholars recognized long ago that institutions form to reduce these

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26. See Ronald Coase, *The Problem of Social Cost*, 3 J.L. & ECON. 1 (1960).

27. Private ordering of liability for cattle trespass is a central issue in ORDER WITHOUT LAW, *supra* note 9; and in Ellickson, *supra* note 13.

transaction costs. One way institutions solve collective action problems is by appointing an agent (e.g., a trade association) to act on behalf of the collective (thus coordinating their actions)<sup>28</sup> and by ensuring the enforceability of the private regime (e.g., through mandatory arbitration).<sup>29</sup>

No institution reduces transaction costs to zero. However, the lower the transaction costs, the closer the parties get to the efficient allocation of entitlements. Since transaction costs impede parties from reaching bargains that they would otherwise want to reach, such parties are likely to adopt the institutions that most reduce transaction costs. Therefore, prevalent institutions are likely to be ones that most reduce transaction costs.

Networks are often the most efficient private regulators.<sup>30</sup> Network effects galvanize four mechanisms, which are frequently more effective at enforcing norms than governments or bilateral arrangements. The first of these mechanisms is the information mechanism—collecting and disseminating among the members information on the credibility of member firms. This mechanism facilitates the development of reputation capital by providing the information that allows others to judge the desirability of transacting with an individual based on that individual's reputation. While the information mechanism is used by some non-network institutions, it is particularly powerful when used by a network, for several reasons. First, networks usually incur lower costs than other institutions in monitoring their members' behavior within the network. Second, networks enjoy credibility when providing negative information on their members (since they generally have an incentive to promote their members). Finally, by monitoring all of their members, networks can exploit economies of scale in gathering and verifying information. Private ordering literature frequently discusses manifestations of the information mechanism, which is commonly employed by networks (e.g., reputation-conveying mechanisms in merchant coalitions described in Greif's<sup>31</sup> and Clay's<sup>32</sup> papers, gossip among neighbors described in Ellickson's paper,<sup>33</sup> etc.).

The second mechanism is the switching mechanism, i.e., replacing a defaulted transaction with an alternate, successful transaction, resulting in

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28. See, e.g., Avner Greif, *Reputation and Coalitions in Medieval Trade: Evidence on the Maghribi Traders*, 49 J. ECON. HIST. 857 (1989). For an expanded discussion of institutions facilitating collective actions, see ELINOR OSTROM, *GOVERNING THE COMMONS: THE EVOLUTION OF INSTITUTIONS FOR COLLECTIVE ACTION* (1990).

29. See, e.g., Bernstein, *supra* note 9, at 124-30, 132-35, 148-51, 153-57 (discussing the use of arbitration among diamond dealers to enforce their PLS).

30. See Aviram, *supra* note 8, at 18-24. The following paragraphs summarize some of the arguments made in Aviram's paper.

31. Greif, *supra* note 9, at 526, 528-31.

32. Clay, *supra* note 9, at 208-12.

33. ORDER WITHOUT LAW, *supra* note 9, at 57-58, 180-82, 210, 213-15, 232-33; Ellickson, *supra* note 13, at 677-78.

minimal loss of transaction-specific investment. Typical bilateral examples are a buyer covering for a contract breached by the seller or a seller reselling goods sold under a contract breached by the buyer; both remedies are provided by the Uniform Commercial Code.<sup>34</sup> In this way, a party injured by a breach of contract enters another contract, with someone else, that most closely resembles the breached contract. This minimizes the injured party's harm from the breach and sometimes deters a party from breaching. An example of this sort of deterrence was provided in a paper by Thomas Palay.<sup>35</sup> His paper describes how railroads and shippers contract to reduce the risk of opportunism resulting from the need to make a transaction-specific investment to ship certain goods by rail. Specially-fitted rail cars are needed to safely transport certain goods. This exposes one of the parties to opportunistic renegotiation of the contract by the other party: once one of the parties—a railroad or a shipper—invests in the rail cars, the other party is in a position to renegotiate the terms of the contracts in its favor, knowing that its partner stands to lose its transaction-specific investment if it refuses to renegotiate. Palay examined those elements of a transaction that insure the vulnerable party against this risk of renegotiation. He found that one of the important elements was the potentially opportunistic party's knowledge that the other party could contract with someone else without losing much of its transaction-specific investment.<sup>36</sup>

While Palay describes a bilateral switching mechanism (one bilateral transaction is negotiated in lieu of another bilateral transaction that has been breached), the switching mechanism is usually more effective when it benefits from network effects. Transacting within networks tends to mimic perfect competition better than bilateral contracting and, therefore, the market that serves as an alternative to the defaulted transaction is more liquid. Also, investments used to transact within a network tend to be less transaction-specific. Thus, the investments can be salvaged from the defaulted deal and used in an alternate transaction. For example, a good reputation may be required for certain transactions. In a world of bilateral contracting, it takes time and effort to establish a good reputation. If Jill had only established a good reputation with one transacting partner (Jack), she may acquiesce to Jack's opportunistic renegotiation of the transaction, knowing that if she refused to renegotiate and the transaction were abandoned, she would have to expend a lot of time and effort to establish a good reputation with another person. If Jack and Jill transacted through a network (e.g., eBay), however, then Jill's reputation would be established network-wide. If Jack threatened to discontinue transacting unless his new demands were met, Jill could transact

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34. U.C.C. § 2-706 (2003) (seller's right to resell); *Id.* § 2-712 (2003) (buyer's right to cover).

35. See Thomas M. Palay, *Comparative Institutional Economics: The Governance of Rail Freight Contracting*, 13 J.L. & ECON. 265 (1984).

36. *Id.* at 271-73.

almost costlessly with someone else. This fact would deter Jack from demanding to renegotiate in the first place.<sup>37</sup>

The third mechanism networks employ to regulate is the control mechanism. In some networks, all transactions are processed through centralized facilities. For example, the electric grid is managed centrally and can facilitate transactions between many power generators and power consumers. Similarly, transactions in electronic marketplaces are often facilitated centrally through the marketplace's server, which records the terms of the transactions. A centralized transacting facility can often reduce the cost of monitoring transactions to detect prohibited behavior and may block or deter harmful (e.g., fraudulent or illegal) transactions. For example, eBay can prevent unlawful ticket scalping by removing offers that violate state anti-scalping laws (prevention), or by reporting such transactions ex post to the relevant attorney general (detection, which leads to deterrence).<sup>38</sup> Alternatively, the central facility may be kept transparent, allowing individuals to observe and detect norm violations.<sup>39</sup> As with the other mechanisms, the control mechanism may exist in non-networked environments. However, economies of scale often make centralized transacting facilities more feasible in networks than in bilateral transactions, since in the former both total transaction volume and transaction complexity tend to be higher.

Finally, the fourth mechanism used by networks to enforce norms is the exclusion mechanism—denying a firm the network benefits of transacting with the other network members by excluding the rogue firm from the network either temporarily (suspension) or permanently (expulsion). This mechanism might be seen as a combination of the information mechanism with an additional element—coordination of the network members' responses to the information provided. This combination ensures that all of the network's transacting power and network effects are withheld from the party that violates the norm.

The efficient use of these four mechanisms makes networks, in many cases,

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37. Unlike the other three mechanisms, the switching mechanism does not require the implementation of any rules in order to have an effect. The very existence of a network produces both the harm mitigation and the deterrent effects. Nonetheless, this mechanism is no different from the other three in differentiating the abilities of networks to regulate behavior.

38. See generally Troy Wolverton, *Online Ticket Market Pressures Scalpers*, CNET NEWS.COM, May 21, 2002, at <http://msn.com.com/2100-1106-918772.html>. It should be noted, however, that ticket scalping specifically proves to be a field in which it is more difficult for networks to combat fraud, because of the great discrepancy among state laws and the large number of cross-jurisdictional transactions, which raise ambiguity as to the applicable law. See Will Courtney, *Are Online Auctions Guilty of E-Scalping?*, EAGLE-TRIB., March 4, 2001, at [http://www.eagletribune.com/news/stories/20010304/FP\\_004.htm](http://www.eagletribune.com/news/stories/20010304/FP_004.htm); *Will the Net End Ticket Scalping?*, MSNBC.COM, Sept. 2, 1999, at <http://zdnet.com.com/2100-11-501311.html>.

39. For example, some sport teams monitor eBay auctions to detect ticket scalping. See Allan Drury, *When it Comes to Ticket Scalping, the Net's the Wild West*, USA TODAY, Oct. 7, 2002, available at [http://www.usatoday.com/tech/webguide/internetlife/2002-10-07-e-scalping\\_x.htm](http://www.usatoday.com/tech/webguide/internetlife/2002-10-07-e-scalping_x.htm).

the least-cost regulator. However, these mechanisms are usually ineffective when they form spontaneously (i.e., are imposed for the first time, and unassisted by other, existent enforcement mechanisms), due to a “chicken and egg” paradox:<sup>40</sup> they are very effective in enforcing behavior once they are perceived as able to enforce that behavior, but they cannot enforce behavior effectively as long as the network members do not perceive them as able to do so. Therefore, it would be difficult for these enforcement mechanisms to form spontaneously. Absent existing enforcement power, they would not be as effective as other methods of regulation (e.g., government regulation, bilateral self-regulation).

Consider, for example, the exclusion mechanism. To enforce a norm, the network threatens its members with ostracism if they fail to conform. The significance of this threat to a member depends on what this ostracism would deny him—what benefits he currently derives from the network. An established network already provides benefits to the members; even a network doing nothing but preventing opportunistic behavior will provide its members with a more amicable transacting environment once it is effective. But until the network has undertaken enforcement for a while and has assured members of its ability to function, its members significantly discount (or do not consider at all) any benefits of membership, and will not be deterred by the threat of exclusion. This becomes a self-fulfilling prophecy as the more skeptical members ignore the threat of exclusion and act opportunistically, dissipating the network’s benefits and persuading those members who initially had faith in the network that the benefit of the network, and hence the cost of exclusion, is negligible.

The same pattern occurs with the other enforcement mechanisms. The switching mechanism, for example, can only deter opportunism if the would-be opportunistic party anticipates that its victim would find a viable alternative transaction. Until the network is active and has proven its ability to offer feasible alternative transactions, would-be opportunists lack a deterrent to renegotiating the transaction. As a result, honest parties, who experience a high incidence of opportunistic renegotiation, will avoid this network and seek either another, more effective network or alternative regulation (bilateral contracting or government intervention). The abandonment of the network by honest members will further exacerbate the problem of finding a feasible alternative transaction, thus weakening the switching mechanism once more.

This paradox need not conclude with the desertion of all members. Not all network members react identically to the perceived effectiveness of the network. Some find it almost costless to follow the norms and do so regardless

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40. The “chicken and egg” paradox makes a reference to the jesting question “which came first, the chicken or the egg?” If the chicken came first, what did it hatch from? If the egg—who laid it?

of the perceived effectiveness of the enforcement mechanisms. Other network members benefit so much from a network (as opposed to the next best alternative available to them) that they find it feasible to remain in the network even when compliance with the norm is low (and thus are sufficiently deterred by the exclusion mechanism). However, this only significantly affects infra-marginal firms; that is, the firms that benefit most from the network or find it least costly to follow the norms. Most other firms find the spontaneous network regulator ineffective, as I explain below. These firms seek the least costly alternate regulator. In some cases, the least costly alternate would be a non-network regulator, such as government regulation or bilateral contracts. But in many circumstances, networks are the most efficient regulators. Thus, most firms will seek another network that avoids the paradox of spontaneous formation.

This quest for the least-cost regulator, in the face of the paradox that plagues spontaneously-formed PLSs, results in a pattern of non-spontaneous evolution—the assumption of responsibility for enforcing a norm by networks that already facilitate other, low-enforcement-cost norms. I will elaborate on what non-spontaneous evolution of PLSs entails later in this Part. Part IV will review some of the more notable work on private ordering and point to documented cases of non-spontaneous evolution.

### *B. The Limits of Decentralized Bonds*

The careful reader might question the speed with which I have disposed of spontaneous formation of PLSs. At the heart of the paradox that impedes spontaneous formation is a problem of assurance—if most network members were assured of the network's ability to enforce a norm, they would follow that norm, and in so doing enable the network to enforce the norm on the few strays that violate it. Assurance problems are hardly a novelty to the veteran institutional economist and are in fact the reason regulation (whether public or private) is needed. Almost any transaction in which the exchange is non-simultaneous requires the party obligated to act later in time to assure the earlier-acting party that he will not renege after reaping the benefits of the earlier-acting party's performance.

For example, suppose Jack owns gold bullion; Jill is a goldsmith. Jack may hire Jill to create exquisite jewelry from his gold bullion. Under the terms of the transaction, Jack will deliver his gold bullion to Jill, who will then melt it and fashion it into jewelry. She will then deliver the jewelry to Jack who, after inspecting the quality of the work, will pay Jill her fee.

The need for mutual assurance should be obvious. Once Jack parts with his gold, Jill may renege on her promise and keep the gold. Jill is also vulnerable—after she has expended time and effort to create the jewelry, Jack may take it and refuse to pay her.

One way of creating mutual assurance is through the public legal system (i.e., the law). Contract law exists for this very purpose—to allow each party to an enforceable agreement to use the state’s enforcement machinery to force the other party to undertake the obligation (or better yet, to deter the other party from reneging). In some cases, criminal law intervenes, replacing private detection of violations with complete government control of both detection and enforcement. But using the public legal system to assure users of a network that its norms will be enforced is often of questionable benefit: if the network is not as good a regulator as the public legal system, it might seem preferable to do away with the network and have the law regulate directly rather than support a less efficient regulator (the network). And, if the network is more efficient than the public legal system, the use of the public legal system to support the network would likely introduce the costs and inefficiencies of the public legal system, which the network had avoided.

PLSs strive, like their public counterpart, to provide assurance to transacting parties. A key bilateral method of providing assurance is by posting “bonds.”<sup>41</sup> Bonds are interests of the assuring party<sup>42</sup> that are placed at the mercy of the assured party. Upon receiving a bond, the assured party may confiscate or destroy it at will, causing harm to the assuring party. Knowing that the assured party will use this power if the assuring party reneged on an obligation, the assuring party will not renege. This provides the assured party with peace of mind. But who will assure the assuring party? If a bond can be confiscated at will (rather than only upon default of the assuring party), then the assured party can confiscate the bond despite proper execution of the underlying obligation. To mitigate this risk (and to guarantee the reciprocal obligation in case of a transaction involving obligations from both parties), bonds can be exchanged.

This practice has been termed an “exchange of hostages,”<sup>43</sup> and in fact, a literal exchange of hostages was among the early forms in which this mechanism was used to assure commitment to peace treaties. Gregory of Tours describes the use of this mechanism in the year 511: “But Theoderic and Childebert entered into a treaty and each took an oath that neither would wage war upon the other. They took hostages so that they might the more firmly adhere to what they had promised. Many sons of senatorial families were thus given.”<sup>44</sup>

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41. See Oliver E. Williamson, *Credible Commitments: Using Hostages to Support Exchange*, 73 AM. ECON. REV. 519, 521 (1983).

42. These interests can include property, rights, reputation or other matter whose destruction or confiscation would affect the assuring party’s utility.

43. Williamson, *supra* note 41, at 519 (citing Thomas C. Schelling, *An Essay on Bargaining*, 73 Am. Econ. Rev. 281, 300 n.17 (1956)).

44. Gregory of Tours, *Enslaving Noble Families*, in 71 PATROLOGIAE CURSUS COMPLETUS 255 (J.P. Migne ed., 1849), reprinted in A SOURCE BOOK FOR MEDIEVAL ECONOMIC HISTORY 288-89 (Roy



The object of the bond need not be loved ones, property, or anything tangible at all. It may be something as intangible as reputation. Indeed, reputation is in its nature a bond—an asset that affects the owner’s utility (by influencing the owner’s future transactions with others) and can be affected by others (both positively and negatively). Unsurprisingly, the private ordering literature has addressed reputation bonds extensively. Lisa Bernstein describes their development and function among diamond traders.<sup>45</sup> Avner Greif and Karen Clay study their effect in merchant coalitions.<sup>46</sup> Robert Ellickson examines their impact on reducing disputes among neighbors over cattle trespass incidents.<sup>47</sup>

Reputation bonds, however, are not a very useful tool for newly-formed PLSs that do not rely on preexisting counterparts. For these networks, like the warlords in the earlier discussion of Pax Dei,<sup>48</sup> one failed episode would lead to elimination, and hence network members discount future interactions with the network (and its members). As discussed in the next subsection, reputation might still be an effective bond if the network members interact with each other outside the network (e.g., are members of the same social circle), or if the network already enforces other norms that will survive its failure to regulate the new norm. But absent either of these, members will not value establishing a good reputation in a network that is expected to fail.

Bonding, whether using tangible or intangible collateral, is an expensive assurance system, and usually a crude one. Non-reciprocal bonding (providing a bond without receiving one) leaves the party offering the bond vulnerable to the other party’s ability to confiscate the bond without cause. Reciprocal bonding is subject to reciprocal confiscation, which may leave both parties worse off, but not by enough to deter an opportunist. For example, if Jack and Jill each give the other \$100 in cash as collateral in order to bond each other into performing their contract, Jill might refuse to return Jack’s gold bullion. When Jack retaliates by confiscating Jill’s collateral, Jill can confiscate Jack’s collateral, so that the bonds will offset each other without a deterrent effect.

Some bonds do not offset each other because they harm one party without providing the other party with any utility. The hostage exchange between Theoderic and Childebert is one such example: killing a hostage harms the hostage’s kin but does not directly benefit the murderer.

But even with such collateral, there is a risk of insufficient deterrence. First, destroying collateral upon suffering a perceived offense might be rational, even when the destruction of the collateral is not profitable, because such destruction

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C. Cave & Herbert H. Coulson eds., 1965).

45. Bernstein, *supra* note 9, at 138-43, 145-48.

46. Clay, *supra* note 9, at 207-16; Greif, *supra* note 9, at 528-31, 535-42.

47. Ellickson, *supra* note 13, at 676-82.

48. See *supra* Part I.

maintains deterrence: it indicates that the same action may be taken again in the future if that person is offended again. Indeed, as Richard Posner explains, this is the rational basis of the concept of revenge.<sup>49</sup> But while excessive sensitivity may provide increased deterrence, it also risks undoing a hostage exchange. Each party has an incentive to be very sensitive, and react to the most minor slights, in order to deter the other party from attempting even minor opportunistic behavior at his expense.<sup>50</sup> As a result, if there are sufficient repeat transactions between parties, each party will overreact, confiscating the bond at the first perception of an offense (in the hope of greater deterrence of the other party in future transactions). But once a bond provided by the other party is confiscated, that other party may reciprocate by confiscating the bond it holds, eliminating the assurance mechanism and increasing the likelihood of a cycle of opportunistic (or outright malicious) behavior.<sup>51</sup>

Second, even when exaggerated sensitivity can be avoided, the value of the collateral is often hard to determine. There is a cost to providing collateral, even when it is not confiscated (e.g., a work of art given as collateral does not bring joy to its owner while it is held by others).<sup>52</sup> This cost creates an incentive to reduce the size of the collateral as much as possible. On the other hand, collateral only deters opportunistic action that is no more profitable than the collateral's value (otherwise, its owner would find it profitable to commit the opportunistic act, pocket the gain, and accept the loss of the collateral). Since gains from opportunistic behavior vary widely, it is hard to anticipate the optimal value of the collateral, and almost any value of collateral would fail to deter some extremely profitable opportunistic behavior. Furthermore, since parties exchanging bonds differ in the degree to which each is vulnerable to the other party's opportunism, and in the loss of utility they suffer in providing the bond, parties might disagree on the optimal value of the bond.

For these reasons, bonds are limited in their ability to deter opportunism. Greif, Milgrom, and Weingast offer a formal game-theoretic model that proves that bilateral bonds (such as bilateral reputation mechanisms) do not deter opportunistic behavior when transactions are at what would be the efficient

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49. See RICHARD A. POSNER, *LAW & LITERATURE* 49-60 (2d ed. 1998).

50. See *id.* at 52-54.

51. The example above of the hostage exchange between Theoderic and Childebert may have failed for this reason. As Gregory of Tours describes: "[B]ut when a new quarrel broke out between the kings [the hostages] were reduced to servitude. . . . And those who had taken care of them now made slaves of them." Gregory of Tours, *supra* note 44. It is noteworthy that the warring parties made slaves of the hostages rather than killing them. This may be a rational action intended to inflict some harm on the "collateral" (enslaving the hostages), while maintaining future deterrence through the ability to inflict additional harm (by killing the hostages). Another rational explanation for this action may be that by enslaving the hostages, each of the kings gained some benefit from "confiscating the collateral" (the value of the slave labor). Killing the hostages would have brought them no direct utility.

52. Another element in the cost of providing collateral is also the risk of unjustified confiscation.

level absent the threat of opportunism.<sup>53</sup> Their model assumes a city that may or may not protect the property and safety of merchants doing business in it. Failing to do so saves the city the cost of providing protection, and provides the city a gain from property confiscated from the merchants. The merchants in this model consider their past experience with the city, and may boycott it and do their business elsewhere if the city has failed to protect them in the past. The merchants in this model are not able, however, to coordinate their responses. Greif, Milgrom and Weingast demonstrate that when trade is at an optimal level, the future stream of income to the city from the individual marginal merchant is almost zero, and therefore less than the value of the goods confiscated or the cost of the protection services that are sometimes withheld.<sup>54</sup> Thus, absent coordination, bonding is insufficient to deter opportunism when the transacting level is optimal.

Greif, Milgrom and Weingast also demonstrate that when coordination (and enforcement of it) is feasible, merchants may be able to deter the city's opportunistic behavior, because the income lost from harming the marginal merchant comprises not only profits the city could have made from that merchant's future dealings, but also from future dealings with all coordinated merchants.<sup>55</sup> Applying this to our inquiry, it is possible that coordinated (centralized) bonding can assure members of a network that has just begun to regulate behavior of its enforcement ability to a degree sufficient to escape the paradox of spontaneous formation.

Since parties seek the least-cost regulator,<sup>56</sup> it is expected that in situations in which network-based regulation is more efficient than other forms of regulation, networks will evolve in a manner that ultimately overcomes the paradox of spontaneous formation by developing from preexisting coordinated bonding mechanisms. This is the non-spontaneous evolution that I intend to explore.

### *C. The Role of Existing Functionality in the Evolution of Private Legal Systems*

Centralized bonding mechanisms are almost invariably network-based. By having the ability to coordinate a response to a party's opportunism (and by thus deterring opportunism), the centralized coordinator provides a benefit to its members. This benefit is characterized by network effects—the more

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53. See Greif et al., *supra* note 13, at 751, 764-67.

54. *Id.*

55. *Id.* at 751-52, 767-71.

56. For obvious reasons, parties seek regulation that is least costly to *them*. Ultimately, however, costs of regulation that are imposed on other parties will also be internalized. For example, if two parties to a transaction adopt a form of second-party regulation to prevent opportunistic default—such as having a bank guarantee a payment—the payer may pay the bank's fee, but ultimately the transaction price would be modified to share that expense. Therefore, in most cases all parties will prefer to adopt regulation that is least costly to *the regulated group as a whole*.

individuals' responses are coordinated, the greater the deterrence of would-be opportunists. Thus, the addition of another member to the centralized bonding mechanism increases the utility of each existing member—precisely the definition of a network effect.<sup>57</sup>

The evolutionary process that results in a PLS has two stages. First, a network creating a centralized bonding mechanism develops, most likely not as an end of its own but as a side effect of regulating a low-enforcement-cost norm (i.e., a norm to which members adhere without coercion). Then, at stage two, the network undertakes to regulate a higher-enforcement-cost norm, using its ability to deny members the benefit of the low-enforcement-cost norm to coerce members to abide by the higher-enforcement-cost norm. The most ubiquitous example of a network that facilitates centralized bonding is a social network. Social networks use reputation bonds. I argued earlier that reputation bonds are ineffective when individuals expect the network to fail. Many social networks, however, continue to exist over long periods of time—one's neighbors, for example, will continue to affect one's social life indefinitely.<sup>58</sup> By gossiping about each other within the social network, and by reacting to the gossip according to common norms, the social network can align most members' responses to a member's deviant behavior. When members of the same social circle are also part of another network that attempts to regulate behavior, they will work to preserve their reputations. While the regulating network cannot in itself harm members of the circle, the negative reputation they build will spread throughout the social network, and there the centralized bonding mechanism will punish them. There is no need for two separate networks, however—one to regulate and the other to punish deviance. If there is demand for certain regulation and networks are the efficient providers, existing networks that enable centralized bonding—such as social networks, religious groups, etc.—will evolve to provide the required regulation.

Looking again at the Pax Dei movement, we may now better understand what made the warlords abide by the imposed constraints on warfare. The religious network provided each member, including the warlords, with fulfillment of spiritual needs and a sense of security and well-being derived from membership in a community. Coordination was achieved both through formal means (religious leaders such as bishops) and informal means (norms and beliefs deeply rooted in the members of the community). Then, when a need to restrict warfare arose, the religious network was the least-cost regulator and quickly evolved to accommodate this need. The community was driven to

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57. The investment each member makes in a network is in itself a bond that expulsion from the network will confiscate. See Rachel E. Kranton, *The Formation of Cooperative Relationships*, 12 J.L. ECON. & ORG. 214 (1996).

58. This Section will explain, below, why social networks may spontaneously form while regulating networks tend to fail if they form spontaneously.

act in uniform hostility to breaches of the peace because their formal coordinators—bishops and keepers of saints' relics—told them to do so (directly or indirectly). Thus, norms of regarding certain forms of violence as “unchristian” could easily take shape. Once the religious network evolved to undertake not just spiritual salvation but also regulation of warfare, the warlords were threatened by their religious network with ostracism (which would deny them the spiritual and social benefits provided by the religious network), and faced the possibility of a coordinated violent response from the members of the religious network. This enforcement power, which existed before the network undertook the regulation of warfare, was effective, for a time, in restricting the warlords' belligerence.

But how do social or religious networks overcome the paradox of spontaneous formation and create a centralized bonding mechanism? After all, for the centralized bonding mechanism to succeed, the network usually needs the ability to enforce on its members uniform adherence to its decisions. For example, in 1284 a German trading ship was attacked and pillaged by Norwegians. The German merchants responded by prohibiting the sale of grain, flour, vegetables and beer to Norway. To enforce the embargo, the German towns posted ships in the Danish Straits. Ultimately, according to the chronicler Detmar, “there broke out a famine so great that [the Norwegians] were forced to make atonement.”<sup>59</sup> The network of German merchants succeeded. But how did they manage to acquire stable enforcement abilities despite the theory that has been elaborated in this Part?

The reason some norms (e.g., those governing social or religious interaction) can be facilitated by spontaneously formed self-enforcing networks, while other norms (e.g., those restricting warfare) are only available when a preexisting network evolves to encompass that norm, lies in enforcement costs. People migrate to the lowest-cost regulator (holding regulation quality constant). Thus, less costly enforcement mechanisms are likely to survive, while more costly counterparts are likely to fail, even if the high-cost mechanism's benefits outweigh the enforcement costs (because the same benefits would be achieved by using the less costly mechanism).

High-enforcement-cost norms do not remain unregulated for long, however, because low-enforcement-cost networks expand to encompass them.<sup>60</sup> Once a network regulates a norm that has low enforcement costs, the (less costly) enforcement mechanisms the network has developed are able to

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59. Greif et al., *supra* note 13, at 757 (citing PHILIPPE DOLLINGER, *THE GERMAN HANSA* 49 (1970)).

60. This is true only if enforcement costs do not outweigh the benefits of enforcement. But as was demonstrated above, *see supra* Section II.A, spontaneously formed networks will fail to enforce norms with high enforcement costs even when those costs are lower than the benefits internalized by all members together, because of the spontaneous formation paradox. This is where other, preexisting networks may evolve to enforce the high-cost, yet welfare-enhancing, norm.

enforce more costly norms, resolving the spontaneous formation paradox.<sup>61</sup> Thus, the network evolves to accommodate the new norm.<sup>62</sup>

For example, because of its low enforcement costs, the social/religious network is likely to survive and continue to provide its members with a sense of community, social interaction, and spiritual guidance. This, in turn, will strengthen its enforcement mechanisms (for example, by increasing the harm it can inflict on a member by excluding her from the network). In contrast, a spontaneously formed network attempting to restrict warfare is likely to fail due to the difficulty its fledgling enforcement mechanisms will have in overcoming the high enforcement costs. This failure—the paradox of spontaneous formation—will occur even if the benefits of restricting warfare outweigh the costs of enforcement. The reason for the failure is not necessarily the infeasibility of enforcing restrictions on warfare, but the low likelihood that an effective enforcement mechanism could overcome the collective action problem and form spontaneously.

Since the barrier to regulating warfare lies not in the infeasibility of doing so, but in an absence of a spontaneously formed enforcement mechanism, a social/religious network can utilize its enforcement mechanisms to regulate warfare. Initially, it can threaten to withhold from non-complying members their benefit from the religious and social functions facilitated by the network. Then, after this threat causes members to comply and peace ensues, the network's enforcement mechanisms become even stronger; expulsion from the network now results not only in a loss of social and spiritual benefits, but in exclusion from the benefits of the restraints on warfare (since members are not restricted when waging war on the excluded party). The expanded network, wielding more powerful enforcement mechanisms, may then evolve to encompass even more costly (and beneficial) norms.<sup>63</sup>

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61. A network can only expand to enforce another norm if its existing enforcement mechanisms are effective against the individuals who need to be disciplined in order to enforce the new norm. For example, a social network in a certain town can perhaps assume a new norm of enforcing peace among the inhabitants of that town. But it cannot enforce peace between inhabitants of other towns, since the enforcement mechanisms of the network can only be employed against network members, and enforcing peace in other towns requires influencing non-members (the inhabitants of the other towns).

62. Since it is the least costly enforcer that will likely become the regulator, two additional conditions must be satisfied in order for a network enforcing a certain norm to evolve into enforcing a more costly norm: (1) the network is the lowest-cost regulator of this norm (as opposed to government intervention or bilateral contracting, for example); and (2) the network has lower costs of enforcement than any other network governing the same group of members.

63. Implicit support for the expectation that every successful step in the evolution of a PLS strengthens its enforcement mechanisms and enables it to regulate even more expensive norms is found in Grief et al., *supra* note 13, at 749. These authors note that the monopolistic rents that medieval merchant guilds accrued for their members assisted in disciplining these members, since expulsion from the guild would cause a merchant to lose those rents. "This type of monopoly rights generated a stream of rents that depended on the support of other members and served as a bond, allowing members to commit themselves to collective action in response to a ruler's transgressions." *Id.* (internal citation omitted). They add:

These guilds, therefore, were able to provide their members with streams of rents in their

To recap, the conditions that a network needs to satisfy in order to expand to regulate another, higher-cost norm are: (1) the norms originally enforced by the network have sufficiently low enforcement costs to form spontaneously and survive (i.e., succeed in enforcing the low-cost norm); (2) the benefits to be internalized by network members from the newly assumed norm outweigh the costs of enforcing the norm; (3) enforcement of the new, higher-cost norm is possible through control of the existing members of the network; (4) the network has lower costs of enforcement than any other network satisfying the previous three conditions; (5) a network is the lowest cost regulator (as opposed to government intervention or bilateral contracting, for example) of the newly assumed norm.

The key to identifying the network that will evolve to regulate other norms is, therefore, enforcement costs. Not all norms have equal enforcement costs. It is easier to get people to interact socially with their neighbors than to get them to keep their contractual obligations to the same neighbors. Social interaction benefits most people more than isolation, and most people would rather interact with some people even if others in the same group snub them. So there are few costs involved in getting people to cooperate in agreeing to interrelate. On the other hand, if some network members break their promises, this will encourage other members to do the same so that they are not taken advantage of by the first group. In some cases, one would not commit to a promise even when she knows that everyone else is committing, in the hope of taking advantage of the others. In either of these cases, some enforcement costs are necessary to secure members' commitment to promises they have made. This Article will refer to the set of network members' relative preferences among the possible reactions to a given norm as the "game type" of that norm. I will address in depth the effects of game types on enforcement costs in the following Part.

Other factors also affect enforcement costs. For example, it is easier for a regulator to enforce a norm when the costs and benefits of its enforcement are roughly equal for each of the members. The greater the divergence in the interests of individuals, the more expensive it is to secure adherence to the

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hometowns. Receiving these rents, however, could have been made conditional on following the recommendations, rules, and directives of the guild. Hence these rents could serve to tie a member to the guild by making change of residence costly and to ensure solidarity among the guild's members.

*Id.* at 757-58 (internal citation omitted). But this is a static view of the PLS. At the time that the social network of merchants in the town had evolved to police a cartel within the town, and thus to secure these monopoly rents, it could use the rents to enhance the power of the exclusion mechanism and evolve the network yet again, this time into regulating merchants' activities abroad. To acquire the monopolistic position in the first place, the guild had to first evolve from enforcing lowest-cost norms (providing social interaction and information), to moderate-cost norms (maintaining a market within the town), to relatively high-cost norms (maintaining a cartel within the town). After each step of this evolution, the network's enforcement mechanisms increased in power by adding the new benefits to the utility the network provided and could take away. This increased power would then enable the network to evolve to even more expensive-to-enforce norms.

norms (or even to formulate them).<sup>64</sup> The reasons for this can perhaps best be shown through an example. Assume a society of people of equal health, but widely differing wealth. In such a society, it would be relatively easy to enforce a norm mandating that people infected with dangerous contagious diseases be quarantined. The probability and severity of harm from the imposition of this norm is distributed in a roughly equal manner. Each person, whether rich or poor, is (roughly) equally vulnerable to diseases, and thus everyone benefits equally from the norm. Each person is also subject to a (roughly) equal probability of being infected by the dangerous disease and thus bearing the cost of the norm—isolation until recovery.

Contrast this with the formation of a norm regarding tax structure (e.g., progressive or regressive taxation, estate taxes, etc.). In this scenario, benefits from the tax would presumably be distributed equally, but its burdens would shift significantly depending on the tax structure. If the tax is progressive, people with higher income will pay a larger percentage of their income than poorer people; similarly, estate taxes place widely varying burdens depending on accumulated wealth. Disagreement, and with it enforcement costs, would be expected to be greater for the latter norm (taxes) than the former norm (medical quarantine).

Not only does the variance of costs and benefits of a norm affect enforcement costs, so does the average net benefit. A network's use of the exclusion, information, or control mechanisms is more effective the more a member benefits from the network. Thus, the enforcement ability of a religious network is likely to be less powerful among a group of secular people than among devoutly religious people, since the latter derive more utility from the spiritual benefits they receive.

Market structure (both that of the various networks in the same market, and that of the various individuals within each network) is yet another criterion affecting enforcement costs. A network that provides significantly more utility to its members than its rivals do is likely to have lower enforcement costs than a network that has to compete with rival networks that can offer members as much (or more) utility. Competition among networks depends not only on the number of competing networks but on the costs of switching between networks and on the number of networks that provide comparable benefits.<sup>65</sup>

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64. See, e.g., Douglas A. Galbi, *Revolutionary Ideas for Radio Regulation* 33 (June 12, 2002) (unpublished manuscript) ("While diversity makes gains from cooperation larger, it also makes cooperation harder to achieve."), at <http://www.galbithink.org/rirr.pdf>.

65. Networks provide comparable benefits to members when they have a similar transacting volume or a similar number of members, provided that most of the utility derived from the network is due to network effects, rather than from the intrinsic value of the facilities that form the network. For example, a telephone has very little intrinsic value; it may serve as a piece of furniture, but most of its utility is derived from the network effects that result from connecting the telephone to a network with many other phones. On the differentiation between the intrinsic value of a network good and the network value of the same good, see Robert Ahdieh, *Making Markets: Network Effects and the Role of*



To illustrate the relationship between competition and enforcement costs, consider a sparsely populated rural area that has a single social circle (or several circles that form a single network). A more densely populated urban area, in contrast, might accommodate several different social networks with little contact among them. Enforcement mechanisms would be more effective in the single rural network than in any one urban network, which a rogue member could abandon in favor of another social network at a low cost.<sup>66</sup>

This list of factors affecting enforcement costs is not exhaustive. A reader familiar with antitrust scholarship may notice the similarity between these criteria and the criteria that facilitate collusion among firms.<sup>67</sup> This is no coincidence, as cartels exhibit one form of behavior regulation: they discipline firms to maintain their prices and outputs at a level maximizing the collective's profits.<sup>68</sup> A cartel fails if it is unable to enforce its mandates—the same enforcement problem that other, socially beneficial PLSs face.

The literature on cartel stability is not immediately applicable to the general analysis of PLSs, however, since it does not discuss an important element described above—the game type of the norm. This is not due to short-sightedness on the part of the scholars in this area, but rather due to a common trait of cartels: the cartel norm (i.e., to abide by the cartel-mandated price or quantity) is nearly always of the Prisoner's Dilemma game type.<sup>69</sup> A cartel member would rank her preferences in abiding to cartel rules as follows: (1) she does not abide by cartel rules but other members do (thus increasing her profits above the cartel level by undercutting the cartel); (2) she abides by cartel rules and so do the other members (thus she gains cartel level profits); (3) she does not abide to the cartel rules and neither do the other members (thus she receives competitive market profits); and finally (4) she abides by cartel rules but other members do not (thus she receives zero profits, since everyone undercuts her higher, cartel-level price).

If pricing at cartel level is considered cooperating and undercutting prices is considered defaulting, then the above set of preferences can be summarized as:

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*Law in the Creation and Restructuring of Securities Markets*, 76 S. CAL. L. REV. 277 (2003).

66. This is not to say that less competition among networks is net welfare-enhancing. While a reduction in competition increases the network's ability to regulate (which is welfare-enhancing), it also decreases the network's incentive to regulate efficiently, as the network may regulate in a manner that enhances or maintains its market power rather than in a manner that reduces opportunism. Whether the increased ability to regulate outweighs the reduced incentive to regulate or vice versa depends on particular circumstances. On differentiating between networks' ability to regulate and networks' incentive to regulate, see Aviram, *supra* note 8, at 57-62.

67. See Dick, *supra* note 16; Stigler, *supra* note 16.

68. Of course, this level is typically not optimal from the perspective of a single firm, assuming that other firms abide by the cartel rules. It is also not optimal from the perspective of all of society (consumers and producers together), since the utility loss by consumers is greater than the utility gain by all producers.

69. The Prisoner's Dilemma game is explained *infra* Section III.G.

$\{D, C\} > \{C, C\} > \{D, D\} > \{C, D\}$ .<sup>70</sup> The same set of preferences holds for each member of the cartel. As Section III.G explains, this set of preferences is characteristic of the Prisoner's Dilemma game. Since (almost) all cartels are Prisoner's Dilemma games, the literature examining cartel stability is not concerned with the underlying game type.

When considering the broader range of norms that a network can enforce, however, one finds a richer variety of game types. The difference in game types matters, because different game types require different costs to enforce an outcome optimal for the players—a Prisoner's Dilemma game requires more costly enforcement than, say, a Meeting Place game.<sup>71</sup> As explained above, differences in a norm's enforcement costs affect the evolution of the institutions facilitating it, because they affect the likelihood that a network enforcing the norm can survive spontaneous formation (the lower the enforcement costs, the higher the likelihood of spontaneous formation). These networks may, in time, evolve to enforce norms requiring high enforcement costs. A reverse direction of evolution, from facilitating norms requiring high enforcement costs to facilitating norms that require low enforcement costs, is much less likely.

### III. A TAXONOMY OF GAME TYPES

This Part will describe a few key game types that characterize norms commonly regulated by networks.<sup>72</sup> The list is far from exhaustive; games can be refined infinitely to suit the unique payoff characteristics of any form of interaction.<sup>73</sup> Since this is an initial exploration of the effect of a norm's game type on the ability of a network to enforce the norm, this Part will examine a handful of archetypal games that broadly describe most norms.

A game type is an abstraction of the incentives of people involved in a given interaction (in this Article's context, a norm administered by a network). The abstraction is made by determining the "payoff" to each player (i.e., the benefit conferred on each player) based on both what that player has done and on what those interacting with that player will do. The payoff is measured in "utils," a generic scale measuring benefits of any kind conferred on a player (e.g., money, other material benefits, spiritual elation, a sense of being loved,

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70. In each pair, the first action listed (Default or Cooperate) is the member's action, while the second is that of the rest of the cartel.

71. The Meeting Place game is explained *infra* Section III.B.

72. On game theory generally, see, for example, GAME THEORY (John Eatwell et al. eds., 1987); and DOUGLAS G. BAIRD ET AL., GAME THEORY AND THE LAW (1994).

73. Even generic games that correctly portray incentives may be mere parts of larger games with different incentive structures. See BAIRD ET AL., *supra* note 72, at 45 ("One must also guard against looking at interactions between players in isolation. A problem that may look like a prisoner's dilemma or some other simple two-by-two game may be part of a much larger game. One cannot assume that, once embedded in a larger game, the play of the smaller game will be the same.").

etc.). A player might receive a different payoff for each combination of her and others' actions; mirroring real life, the choice a player makes affects her welfare, but so do the choices others make.

The real-life situations that games mimic are often intricate, but games are structured in a simple, abstracted form in order to allow easy logical (or mathematical) analysis. To reduce complication, several abstractions will be made in the games examined in this Article. First, there are two players in each game—a network member and the other network members (or a network member and the network governance institution). Second, each player is limited to a choice between two actions. These actions will change from game to game depending on the illustrative story of the game, but generally they will be “Cooperate” ( $\{C\}$ ) and “Default” ( $\{D\}$ ).<sup>74</sup>

In order to assess the likely outcome of a game, I identify whether the game has one or more Nash equilibria. A Nash equilibrium describes the state of affairs in which each player, knowing what the other player's actions will be, cannot improve her own situation by changing her actions.<sup>75</sup> This means that if the game we examine repeats itself several times, and at a given iteration of the game the players reach a Nash equilibrium, each is likely to repeat her actions in following games as long as she expects the other player to repeat his actions as well. Therefore, the Nash equilibrium indicates the likely status quo in an iteration of a game. If a game has more than one Nash equilibrium, the status quo is likely to be the first Nash equilibrium that the players reach. A Nash equilibrium is not necessarily the efficient outcome of a game,<sup>76</sup> but merely a likely outcome of that game.

To clarify the concept of a game type, consider the following game in

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74. To make the illustrative examples more intuitive, this Article will sometimes call the more socially beneficial of the two actions “cooperating,” while the other, less virtuous action will be called “defaulting.” But this is not always the case. There does not have to be anything morally or socially better in an action called “cooperating” as compared to an action called “defaulting.” In some games the two options would be equivalent morally and from a welfare-maximizing perspective. For example, in the Battle of the Sexes game, *see infra* Section III.C, the “cooperating” action is going to see a baseball game, while the “defaulting” action is going to see a movie. The tags of cooperation and default are used merely to make this game comparable to other games discussed in this Section, and not to denote a positive or negative connotation to either action.

75. A more formal definition of a Nash equilibrium is a set of actions (one for each player) under which a player, knowing what the other players' actions are, could not improve her utility by changing her action. On Nash equilibrium, see John F. Nash, Jr., *Equilibrium Points in  $N$ -Person Games*, 36 PROC. NAT'L ACAD. SCI. 48 (1950); John Nash, *Non-Cooperative Games*, 54 ANNALS OF MATHEMATICS 286 (1951). *See also* David M. Kreps, *Nash Equilibrium*, in GAME THEORY, *supra* note 72, at 167-77.

76. Unless explicitly stated otherwise, an “efficient” or “optimal” outcome of a game refers to the perspective of all players' utility considered jointly (not the perspective of any individual player). Externalities on non-players need not be considered, since games (for abstraction purposes) assume that only players are affected by the games' outcomes. However, when the Article refers to “efficient” or “optimal” outcomes outside the context of a game, it refers to the perspective of all of society's members (including those who are not “players,” in the sense that their actions have no impact on the outcome, but the outcome affects them).

which the norm is to be nice to others, yet the players prefer to scorn one another. Statler and Waldorf, the grumpy old men sitting in the balcony in “The Muppet Show,” love to express derision at anything and everything. When the Muppet Show is not on and they find no targets for their venom on stage, they must verbally attack each other. From Statler’s point of view, the optimal situation occurs when he says something nasty to Waldorf, and Waldorf does not reply. Second to this is a situation in which they exchange gibes. Much less satisfying for Statler is a situation in which both Statler and Waldorf are nice to each other, and their venom fails to find an outlet. Bad as that sounds, it can get worse—Statler might be nice to Waldorf, who in return will mock Statler with a nasty jeer. In the eyes of mean spirited Statler and Waldorf, suffering an unanswered jab is more humiliating than having everyone play nice.<sup>77</sup>

Waldorf has the same preferences as Statler (reversing the roles, of course). Abstracting these preferences into a table, the payoff structure will look like this:<sup>78</sup>

	Waldorf acts nice	Waldorf mocks
Statler acts nice	1, 1	0, 3
Statler mocks	3, 0	2, 2

Placing the payoff information in a table helps us identify the likely outcome (i.e., the Nash equilibrium). Let’s put ourselves in Statler’s shoes. If he expects Waldorf to be nice, Statler is better off mocking him (he will then get 3 “utils” (southwest box) instead of one util (northwest box)). And if Statler expects Waldorf to mock him, Statler will once again mock Waldorf (he will get 2 utils (southeast box) rather than zero utils (northeast box)). So Statler will mock Waldorf regardless of what he expects Waldorf to do. Since Waldorf has the same preferences, he will reach the same conclusion (i.e., that it is in his interest to mock Statler regardless of what Statler does), and the two will end up teasing and insulting each other. That’s good news (in this game): this happens to be the welfare-maximizing solution, since they get two utils each, or 4 total—a larger total than is available in any of the other boxes.

This game is known as Deadlock because if being nice were considered to be “cooperating” with the norm, the parties would be deadlocked in refusal to cooperate.<sup>79</sup>

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77. To summarize, the set of preferences for each player of the Deadlock game is:  $\{D, C\} > \{D, D\} > \{C, C\} > \{C, D\}$ .

78. For the payoff set in each box, Statler’s payoff is noted first, then Waldorf’s payoff.

79. A commonly cited real world example of this game would be arms control negotiations between two countries that do not want to disarm (i.e., would prefer that both they and their enemy be armed rather than both they and their enemy be unarmed). The likely result is a failure of the arms control negotiations. See, e.g., Janet Chen et al., *Game Theory—Non Zero Sum Games—Other*

The Deadlock game is among those in which it would be most costly to enforce mutual cooperation; not only do the parties in this game tend not to cooperate, but the welfare-maximizing situation for them is mutual default. So if they coordinated their actions, they would opt for mutual default rather than mutual cooperation. Imagine, for example, Statler and Waldorf's response if Kermit tried to force them to act kindly to each other.<sup>80</sup>

The following Sections will examine other games, their illustrative stories, their payoff structures, the likely behavior of their players and the relative ease of enforcing cooperation among their players.

### A. *Harmony*

The Harmony game is the inverse of the Deadlock game.<sup>81</sup> It is the easiest game in which to enforce mutual cooperation. In fact, no enforcement at all is necessary. Alice and Bill, two very good friends, face a choice between the same two actions that Statler and Waldorf chose from in the Deadlock game: each can either be nice to the other or mock the other. Unlike Statler and Waldorf, Alice and Bill prefer to be nice to the other, even when they are slighted by the other. (After all, they reason, the other's slight may have been merely a misperception, and at any rate, they care for each other so much that hurting the other would indirectly hurt them.) The second-worst possibility for each is to mock the other. In that case, each hopes that the other would show restraint and not mock back. (This would be worse than being mocked while being nice, since the shame of being rude to one's friend outweighs the anger at being mocked.) The worst outcome for Alice and Bill would be to slip into mutual taunting.<sup>82</sup> Putting these preferences into a payoff table yields this:<sup>83</sup>

	Bill acts nice	Bill mocks
Alice acts nice	3, 3	2, 1
Alice mocks	1, 2	0, 0

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Dilemmas, at <http://cse.stanford.edu/classes/sophomore-college/projects-98/game-theory/dilemma.html> (last visited Dec. 10, 2003). The Statler and Waldorf example demonstrates that the game type of a norm depends not only on the content of the norm itself but on the preferences of the individuals to which the norm applies. Were Statler and Waldorf less keen to insult each other and more concerned about protecting themselves from being insulted, a norm of being nice would not lead to a Deadlock game's payoffs. Later in this Article we will see how the same norm (being nice to others) leads to a Harmony game payoff when the players care deeply for one another.

80. Fortunately, absent externalities on non-players, mutual defection is the optimal equilibrium for a Deadlock game, so enforcing cooperation may not be beneficial. If the goal of enforcement is not to achieve mutual cooperation, but to achieve maximum joint social welfare, then the Deadlock game is very inexpensive to enforce—it will result in mutual default without any enforcement.

81. On the Harmony game see, for example, Amir N. Licht, *Games Commissions Play: 2x2 Games of International Securities Regulation*, 24 YALE J. INT'L L. 61, 108-11 (1999).

82. The set of preferences for each player of the Harmony game is:  $\{C, C\} > \{C, D\} > \{D, C\} > \{D, D\}$ .

83. In each box, Alice's payoff is noted first, then Bill's payoff.

If Alice anticipates that Bill will be nice to her, she will reciprocate (she would get 3 utils in that case, rather than 1 if she mocked him). If Alice anticipates that Bill will mock her, she will still be nice to him (as she would get two points for being nice despite Bill's behavior, while she would get zero points if she mocked back). So, Alice will always be nice to Bill. Since Bill has the same preferences, he will always be nice to Alice. There is therefore only one Nash equilibrium in this game: mutual cooperation. This means that no enforcement is needed to achieve mutual cooperation.

### B. Meeting Place

Meeting Place is the second least expensive game in which to enforce mutual cooperation (after the Harmony game). Alice and Bill—still very good friends—can either wait at the lobby of the law school, or at the library. Since they enjoy each others' company, they derive the most utility when they are both waiting in the same place: the meeting place. They are indifferent as to whether the meeting place is the lobby or the library, as long as they are both there. If they are not together, they are unhappy to the same degree, whether Alice is waiting at the lobby and Bill at the library, or vice versa.<sup>84</sup> To put the payoff structure into a table:<sup>85</sup>

	Bill at lobby	Bill at library
Alice at lobby	2, 2	0, 0
Alice at library	0, 0	2, 2

What will each of them do? If Alice thinks Bill will go to the lobby, she will too. If she thinks Bill will go to the library, so will she. Bill will do the same. Each of them may fail to anticipate where the other is going and end up apart despite the fact that both of them want to be together. However, the cost of enforcing cooperation is very low: all that is needed is to convey information from one of them to the other as to where he or she will be.<sup>86</sup> There is no need for bilateral communication or for negotiating an agreement—once one knows of the other's action, the other will adjust behavior to ensure that they meet.

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84. The set of preferences for each player of the Meeting Place game can be summarized as:  $\{C, C\} = \{D, D\} > \{C, D\} = \{D, C\}$ .

85. In each box, Alice's payoff is noted first, then Bill's payoff.

86. Quite often, both parties will converge on the same location, even without coordination. See Thomas C. Schelling, *Bargaining, Communication, and Limited War*, 1 CONFLICT RESOL. 19, 20-21 (1957). Schelling discusses an experiment in which people were told they are to meet someone in New York City, though they do not have a prior understanding as to when and where the meeting will take place and cannot communicate with that person prior to the meeting. Schelling reports that an absolute majority picked Grand Central Station as the meeting place, and virtually all of them picked noon as the meeting time.

C. *Battle of the Sexes*

Battle of the Sexes adds one important twist to the Meeting Place game: the players now have opposite preferences as to the location where they will meet, but each still prefers to be together in the disfavored location to being alone in a favored location. Alice and Bill, now wife and husband, make evening plans. As with the other games, they are limited to two choices: either go to a baseball game (Alice's favorite pastime), or see a movie (Bill's favorite activity).<sup>87</sup> Loving couple that they are, each prefers to do the activity he or she less favors and be together, rather than opt for the favorite activity and be apart. Unlike the Meeting Place game, however, each is partial to a particular activity (and their preferences conflict).<sup>88</sup> Also, excessive munificence by both will lead to the worst of possible situations, in which Alice goes to see a movie (to please Bill), while Bill goes to the baseball game (to please Alice). The payoff table may be as follows:<sup>89</sup>

	Bill sees baseball	Bill sees movie
Alice sees baseball	3, 2	1, 1
Alice sees movie	0, 0	2, 3

Absent coordination, the players might find themselves sliding into the worst outcome; paradoxically, this is more likely to happen the greater their mutual care for each other. Consider O. Henry's story, *The Gift of the Magi*, in which a poor, loving couple seek to buy each other Christmas gifts.<sup>90</sup> Jim sells his pocket watch to buy Della a set of combs; Della sells her hair to a wig maker to buy Jim a gold chain for his pocket watch. The sacrifice of something important to each (Jim's watch, Della's long hair) would have been beneficial to both parties if the benefactor had not sacrificed as well (since Della cannot use the combs Jim bought her after cutting her hair, and Jim cannot use the gold chain Della bought him after selling his watch). Had they been able to coordinate, they would have decided on a set of actions that would have made them happier (by preventing each from taking an action that reduces the ability

87. In the original formulation of the illustrative example of this game, a husband wanted to watch a boxing match while the wife wanted to watch a ballet performance. That example is attributed to R. Duncan Luce and Howard Raiffa. See David Crump, *Game Theory, Legislation, and the Multiple Meanings of Equality*, 38 HARV. J. ON LEGIS. 331, 367 n.156 (2001).

88. If going to a baseball game is considered as action "C" while going to a movie is considered as action "D", then in a Battle of the Sexes game the set of preferences for Alice is: {C, C}>{D, D}>{C, D}>{D, C}; Bill's set of preferences is: {D, D}>{C, C}>{D, C}>{C, D}.

89. In each box, Alice's payoff is noted first, then Bill's payoff.

90. O. HENRY, *The Gift of the Magi*, in THE BEST SHORT STORIES OF O. HENRY I (Bennett A. Cerf & Van H. Cartmell eds., 1994).

to benefit from the other's gift).<sup>91</sup>

An enforcement mechanism is needed, therefore, to ensure an outcome that is optimal for Battle of the Sexes players. It might suffice for this mechanism to convey to one party the other party's intended actions (e.g., notify Bill that Alice has decided to go see a baseball game, in which case Bill will decide to do the same). Unlike the Meeting Place game, however, each player prefers one plan over the other, so allocation of the surplus from cooperating becomes an issue. If this is a repeated game (e.g., Alice and Bill have to make decisions as to evening plans every day), each may act strategically to get the other party to meet at his or her preferred place. For example, Bill may go to the movies—despite knowing that Alice is going to the baseball game—in order to signal to her that he would prefer that they go together to the movies. He will suffer a loss in the short term (since he prefers to be with Alice at the baseball stadium to being alone at the cinema), but his signal may facilitate long-term gains (by going more often together to the movies, rather than going together to the baseball game).

The need to decide how to allocate the cooperative surplus and the likelihood of strategic behavior on the part of either (or both) parties increases both the cost of negotiating a plan for where they will go each day and the risk that either party will renege on the agreement in order to renegotiate it in his or her favor. However, because the short-term interests of both parties lie in cooperating, enforcement costs are still much lower than in game types in which the parties do not favor cooperation as a goal in itself.

#### D. Stag Hunt

The Stag Hunt game is based on a passage in Jean-Jacques Rousseau's *Discourse on the Origin and Basis of Inequality Among Men*.<sup>92</sup> In the passage, Rousseau discusses cooperation among hunters. To hunt a deer that will feed all the participating hunters, each hunter must stay at his post; if one hunter abandons his post, the deer can escape. However, continues Rousseau, if any

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91. *The Gift of the Magi* might not be an ideal example of a failure in a Battle of the Sexes game, because O. Henry states clearly in the end of the story that the mutual sacrifices are of great value. *Id.* While the gifts were not usable, they did indicate strong affection and therefore provided utility to the players. In a true Battle of the Sexes game, a player derives no utility from knowing the other player made a sacrifice (unless that sacrifice causes the two to be together, in which case the utility would be from being together, not from being the beneficiary of a sacrifice).

92. JEAN-JACQUES ROUSSEAU, DISCOURSE ON THE ORIGIN AND BASIS OF INEQUALITY AMONG MEN 428 (Everyman's Library 1950) (1755) ("In this manner, men may have insensibly acquired some gross ideas of mutual undertakings, and of the advantages of fulfilling them: that is, just so far as their present and apparent interest was concerned: for they were perfect strangers to foresight, and were so far from troubling themselves about the distant future, that they hardly thought of the morrow. If a deer was to be taken, every one saw that, in order to succeed, he must abide faithfully by his post: but if a hare happened to come within the reach of any one of them, it is not to be doubted that he pursued it without scruple, and, having seized his prey, cared very little, if by so doing he caused his companions to miss



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one of the hunters encounters a hare (which can be caught by a single hunter, but barely provides enough food for a single hunter), he will likely abandon his post and capture the hare. If even one of the hunters abandons the stag hunt to catch a hare, the deer hunt will fail.<sup>93</sup> The payoffs for this game (with two hunters) are as follows:<sup>94</sup>

	Hunter B ambushes deer	Hunter B chases hare
Hunter A ambushes deer	3, 3	1, 0
Hunter A chases hare	0, 1	1, 1

Why would a hunter abandon his post and opt for the hare when he can receive more food if the stag hunt is successful? Capturing a hare is completely within the control of the individual hunter; capturing the stag is not. If a hunter suspects one of his fellows will abandon a post, he should do the same, since any stag that enters can escape, leaving the hunter with neither stag nor hare.

The Stag Hunt is a relatively inexpensive game to enforce, though it is likely to be more expensive to enforce than the two previously described games. Like Meeting Place and Battle of the Sexes, it has two Nash equilibria.<sup>95</sup> But here one equilibrium results in greater welfare for both parties than the other equilibrium; unlike the Meeting Place and Battle of the Sexes games, in which a person concerned only with joint welfare maximization would be indifferent as to which equilibrium resulted,<sup>96</sup> the players in the Stag Hunt prefer mutual cooperation. This increases the benefit to both players from ensuring mutual cooperation but also requires expending enforcement costs in order to reach one equilibrium rather than another. Enforcement costs are not very high, however, since both players seek the same equilibrium and therefore will not act strategically to deceive each other. However, each player needs some assurance that the other player will not default.

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93. The set of preferences for each player of the Stag Hunt game is:  $\{C, C\} > \{D, C\} \geq \{D, D\} > \{C, D\}$ .

94. In each box, Hunter A's payoff is noted first, then Hunter B's payoff.

95. One Nash equilibrium is {Hunt Stag, Hunt Stag} (in generic terms,  $\{C, C\}$ ); the other is {Chase Hare, Chase Hare} (in generic terms  $\{D, D\}$ ).

96. In the Meeting Place game, one would also be indifferent as to the allocative differences between the two equilibria (because there are none—both players gain the same payoffs in either equilibrium). In the Battle of the Sexes game, however, there are allocative differences (though not differences in total welfare) between the equilibria—Alice is better off if she and Bill go to see a baseball game; Bill is better off if they go to a movie.

E. *Chicken*

The Chicken game is a game of coordination, not cooperation. Its story is illustrated in the movie *Rebel Without a Cause*.<sup>97</sup> Jim Stark (actor James Dean) and Buzz Gunderson compete for Judy's love by playing the "chicken-run" game. Jim and Buzz steal two cars, which they race towards a cliff. The first driver to jump out of his car ("chicken out") loses the game; the other driver can then jump out of his car and is considered the winner, gaining Judy's affection and the respect of his peers. A player who fails to jump out of his car in time will run off the cliff with the car and plunge to the ground.

The order of preferences for each driver is thus as follows: (1) wait for the other driver to "chicken out" (i.e., jump first) and thus win the game; (2) chicken out while the other driver does the same (no shame for either driver); (3) chicken out while the other driver waits (a shameful loss); and worst of all, (4) continue driving toward the cliff while the other driver does the same, resulting in both drivers plunging to their deaths.<sup>98</sup> The payoff table is:<sup>99</sup>

	Buzz chickens out	Buzz waits
Jim chickens out	2, 2	1, 3
Jim waits	3, 1	0, 0

The action each player takes is the inverse of what he thinks the other player will do. If Jim thinks Buzz will chicken out, Jim would be wise to wait. If Jim thinks Buzz will wait (i.e., not jump until Jim does), Jim should chicken out so as not to die. When this game is played repeatedly so that reputation matters to the players, each would be wise to invest in building a reputation for aggressiveness, so that the other party thinks he will not chicken out. Once this reputation is established, the other player would be rational to chicken out, and so the aggressive player will gain the most favorable outcome (winning the Chicken game) in all future interactions.

Enforcing mutual cooperation in the context of the Chicken game (mutually "chickening out") is more expensive than in the Meeting Place, Battle of the Sexes, or Stag Hunt games, since in the Chicken game, the natural equilibrium for a player who knows what his rival will do is never to cooperate and do the same.<sup>100</sup> Reaching an equilibrium in the Chicken game may not be difficult. Each player wants to know what the other player intends to do or, alternatively,

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97. *REBEL WITHOUT A CAUSE* (Warner Studios 1955).

98. The set of preferences for each Chicken player is thus:  $\{D, C\} > \{C, C\} > \{C, D\} > \{D, D\}$ .

99. In each box, Jim's payoff is noted first, then Buzz's payoff.

100. Rather, the player will either chicken out (cooperate) if the other player defaults, or default (wait in the car) if the other player cooperates.

credibly convey to the other player what his own actions will be (which, if the other player is rational, would make his response predictable). Once one player credibly communicates the action he intends to take to the other player (i.e., demonstrates to the other party that a particular action is the only feasible option for that player),<sup>101</sup> they will be in an equilibrium. But this equilibrium will not be mutual cooperation; to reach mutual cooperation, the players must be forced to cooperate. Even if cooperation were achieved, it would not be stable. Any success in causing the players to cooperate (mutually chicken out) would only increase each party's incentive to take advantage of the other's cooperation (chickening out) and default (continue driving toward the cliff). Thus, the more effort is made to coerce one of the Chicken players to cooperate, the greater the incentive for the other player to default.

### F. Bully

The Bully game is a hybrid of the Chicken game and the Deadlock game. One player has payoffs similar to those in a Chicken game, while the other has payoffs similar to those in a Deadlock game. An example of this game type is the biblical story of the trial before King Solomon.<sup>102</sup> According to that story, two women gave birth, but only one of the babies survived. Both women claimed the living infant as their own. Both women knew which of them gave birth to the surviving child, but neither had sufficient evidence to establish to a third party (in this case, King Solomon) that it was she who bore the child. The women appealed to King Solomon for judgment. The king offered to cut the baby and give each woman half of it. One woman agreed to this "compromise," while the other declined, explaining that she preferred that the baby be given to her rival than that it die. At this, King Solomon announced that this latter woman was the real mother and awarded the baby to her.

King Solomon was quick to understand the Bully game underlying the case before him.<sup>103</sup> The real mother, knowing the baby was hers and loving him, faced Chicken game payoffs. She would most like to claim the baby (default) while the other woman made no claim (cooperated). Her second preference would have been, perhaps, that both women revoke their claims (mutual cooperation) and that the baby go to someone else, but this was not an option

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101. An example of credible commitment in the context of the Chicken game would have one player develop a reputation of fearlessness and irresponsible risk-taking. This would make him more likely in the eyes of the other player to risk his life and wait in the car to the very last moment. Assuming this as the likely action of his rival, the other player faces the choice between staying in his car (and plunging down the cliff), or chickening out; of these alternatives, he is better off chickening out. Credible commitment of aggressive intentions is costly in itself, and most likely both parties will expend this cost in a competition to deter the other party.

102. See 1 *Kings* 3:16-28. While the use of Solomon's trial as an illustration of the Bully game is not original to me, I have not found a reference to the trial in the game theory literature.

103. On King Solomon's strategy in this trial, see Saul Levmore, *Rethinking Group Responsibility and Strategic Threats in Biblical Texts and Modern Law*, 71 CHI.-KENT L. REV. 85, 91-94 (1995).

available in the story. The third preference was to revoke her claim (cooperate) while the false mother insisted on her claim (defaulted) and would receive custody of the baby. This was, to the real mother, better than mutual insistence on claims to the baby (mutual default), which would have resulted in the baby's death.

The false mother, driven more by jealousy of the real mother than by love of the baby, had a Deadlock game preference structure. She would most like to claim the baby (default) while the real mother revoked her claim. But, for her, the second-best option was not to have the baby live with another, but to deprive everyone of the baby. Thus, her second preference was insisting on her claim while the real mother insisted as well. The third preference would have been depriving the real mother of the baby by having both the real and false mothers revoke claims to the baby and hand the baby to others. The worst option, from the false mother's perspective, was to revoke her claim while the real mother insisted on her claim and received custody of the baby.<sup>104</sup> The payoff structure is, therefore:<sup>105</sup>

	False mother waives claim	False mother insists on claim
Real mother waives claim	2, 1	1, 3
Real mother insists on claim	3, 0	0, 2

Solomon understood that in order to discover the truth in the absence of evidence, he would need to create an incentive structure that would distinguish the real mother (who would have a Chicken game incentive structure) from the false mother (who would have a Deadlock payoff structure). When the women came before Solomon, each petitioned for her first preference (being awarded the baby). Since both Chicken and Bully payoffs have the same first preference, this could not differentiate between the two. By threatening to kill the baby if both women insisted on their claims, Solomon created the payoff structure of a Bully game. The Deadlock player (false mother) had a credible threat of defaulting (insisting on the baby even if this led to the baby's death). Knowing this, the Chicken player (real mother) had only one equilibrium—to chicken out (waive claims to the baby) in order to reach a {C, D} result, which she preferred to {D, D}. Since the Bully game has a single equilibrium, in which the Chicken player cooperates and the Deadlock player defaults,

104. To summarize, the sets of preferences in the Bully game, for the Chicken player, are: {D, C} > {C, C} > {C, D} > {D, D}; and for the Deadlock player: {D, C} > {D, D} > {C, C} > {C, D}.

105. In each box, the real mother's payoff is noted first, then the false mother's payoff.

Solomon could know that the woman who cooperated was the Chicken player—the real mother (or, at least, the woman who cared more for the baby).

Bully games are more stable than Chicken games, but they are even more costly to enforce into mutual cooperation. It would take significant expenditures to prevent the Deadlock player from defaulting because that player's incentive structure strongly favors defaulting (recall our example of Statler and Waldorf). Further complicating a cooperative outcome, if the Deadlock player is somehow coerced to cooperate, the Chicken player will have a strong incentive to default. Moreover, from a static (single game) perspective, an outcome of {C, D} might be efficient (i.e., lead to the largest sum of "utils" calculated jointly for both players); this would depend on the exact payoffs in the specific circumstances.<sup>106</sup> But from a dynamic perspective (repeating games), the Chicken player will eventually either be eliminated or (if she can) withdraw from interacting with the "bully" Deadlock player. This would reduce interaction—and hence network effects—below the level it could be at if the bully were restrained.

#### G. Prisoner's Dilemma

The final game described in this abbreviated taxonomy, and the one in which it is most costly to enforce the jointly beneficial outcome, is the Prisoner's Dilemma game.<sup>107</sup> One version of its illustrative story is the following.<sup>108</sup> Two men, Carl and Dan, commit armed robbery and are arrested on weapons charges. Both suspects are held in separate rooms where they cannot talk to each other. The district attorney approaches Carl and says: "We know that you robbed the bank. If you confess and testify against Dan we will let you go free and Dan will get fifteen years. If you don't testify, we have enough to get you on a weapons charge, and you will get three years in jail." Suspicious of the offer, Carl asks, "What's the catch?" The district attorney replies, "The catch is that we are offering the same deal to Dan and, if you turn each other in, both of you will get ten years for armed robbery."

The set of preferences each of the prisoners has is clear. The top preference for each would be to testify while the other remained silent (the one who testifies against the other would receive no jail time, while the prisoner he testified against served fifteen years). The second best option would be to remain silent while the other prisoner remains silent as well (each would serve

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106. In the case of the payoffs noted in the table, the equilibrium of {C, D} is actually the welfare-maximizing one, with a total of 4 utils—three to the Deadlock player and one to the Chicken player. This, of course, may create issues regarding the distribution of the gains, regardless of its efficiency.

107. On the Prisoner's Dilemma game see, for example, Anatol Rapoport, *Prisoner's Dilemma*, in *GAME THEORY*, *supra* note 72, at 199-204.

108. This specific illustrative fact pattern is taken, with minor modifications, from Richard W. Painter, *Game Theoretic and Contractarian Paradigms in the Uneasy Relationship Between Regulators and Regulatory Lawyers*, 65 *FORDHAM L. REV.* 149, 153 n.24 (1996).

three years on the weapons charge). Third best would be confessing while the other prisoner confessed (both would serve ten years for robbery). The worst outcome would be to remain silent while the other prisoner confessed (the silent prisoner would spend fifteen years in jail while the confessor will receive immunity).<sup>109</sup> The payoff table is, therefore:<sup>110</sup>

	Dan keeps silent	Dan confesses
Carl keeps silent	2, 2	0, 3
Carl confesses	3, 0	1, 1

The prisoners would maximize their joint welfare by mutual cooperation (in this case, by both remaining silent), thus earning a total of 4 utils. The worst possible outcome (from the perspective of joint welfare) is mutual default (both confess). Yet, if Carl expects Dan to remain silent, Carl is better off confessing (3 utils as opposed to 2). And if Carl expects Dan to confess, Carl certainly prefers to confess (1 util instead of 0). As a result, Carl will confess regardless of what he expects Dan to do. Dan would do the same. They will mutually default, the worst possible outcome for the two.

An amusing example of the logic leading to mutual default in a Prisoner's Dilemma is found in Joseph Heller's *Catch-22*. Yossarian, an officer serving in the U.S. Army Air Force during World War II, decides to desert the military. Major Danby attempts to dissuade him, appealing to his sense of duty. Yossarian insists:

"I am turning my bombsight in for the duration. From now on I'm thinking only of me."

Major Danby replied indulgently with a superior smile, "But, Yossarian, suppose everyone felt that way?"

"Then I'd certainly be a damned fool to feel any other way, wouldn't I?"<sup>111</sup>

A coordination mechanism (i.e., something that conveys information to one party as to what the other party will do) does not suffice to alleviate the Prisoner's Dilemma. Each prisoner will default regardless of what he expects the other prisoner to do. Also, unlike the Stag Hunt game, forcing one party to cooperate does not suffice, since the other party will default even if it knows the first party will cooperate. To enforce mutual cooperation, deterrence or coercion of both players must be effective. Curiously, as discussed below, some of the most beneficial norms, which are closely associated with "regulation" (e.g., mitigating opportunism), are of the Prisoner's Dilemma

109. In other words, as mentioned *infra* Section II.C, the set of preferences for each player in the Prisoner's Dilemma game can be summarized as:  $\{D, C\} > \{C, C\} > \{D, D\} > \{C, D\}$ .

110. In each box, Carl's payoff is noted first, then Jim's payoff.

111. JOSEPH HELLER, *CATCH-22*, at 456 (Scribner 1996) (1955).

type; thus mutual cooperation is very costly to enforce in them.<sup>112</sup> Such norms are unlikely to be able to form spontaneously. It is for these norms that PLS evolution is most necessary.

#### IV. APPLYING THE THEORY: THE EXTANT LITERATURE FROM AN EVOLUTIONARY PERSPECTIVE

##### A. *Assessing Enforcement Costs of Regulated Norms*

Below, I will examine how observations made in leading works of private ordering scholarship support the theory of non-spontaneous evolution of PLSs. This theory holds that PLSs begin as networks regulating low-enforcement-cost norms, then expand to regulate norms that are more expensive to enforce (but are also beneficial to the network's members). Therefore, a rough idea of the enforcement costs of the relevant norms is needed.<sup>113</sup> As discussed above,<sup>114</sup> some of the more significant criteria include: the average utility of the norm to a member,<sup>115</sup> the variance in utility among members,<sup>116</sup> the market structure both at the network level (the extent of competition among networks)<sup>117</sup> and at the individual level (relative power of each of the network's members),<sup>118</sup> and the game type of the norm.<sup>119</sup>

The literature discussing PLSs does not contain much variety in the average utility to network members; the PLSs discussed tend to be ones providing significant utility. This is hardly surprising, because examining networks that provide relatively unimportant services (i.e., which provide low utility to

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112. See *infra* Section IV.C.

113. Because the works discussed in this Section were not created with the theory of non-spontaneous evolution in mind, they do not contain all the information pertinent to this Article's thesis. The best that can be done at this time is to gain a rough sense of enforcement costs and to imperfectly describe the evolution of the networks described in the works discussed in this Section. In the future, case studies specifically aimed at testing this theory may improve on these first steps.

114. See *supra* Section II.C.

115. Generally, the higher the utility, the lower the enforcement costs.

116. Generally, the lower the variance, the lower the enforcement costs.

117. The lower the competition, the lower the enforcement costs. But as noted above, reduced competition among networks is not necessarily net welfare enhancing. A reduction in competition increases the network's ability to regulate (which is welfare enhancing), but also decreases the network's incentive to regulate efficiently, which is welfare reducing. Which of these has a greater effect on welfare depends on particular circumstances. See *supra* note 66.

118. The lower the market power of the network's members, the lower the enforcement costs. Network members with significant market power are more likely to degrade connectivity within the network (e.g., by not following the rules, transacting outside of the network, etc.). For example, Lisa Bernstein notes that larger diamond dealers (presumably having more market power than their smaller rivals) often trade outside of the diamond exchange. See Bernstein, *supra* note 9, at 120 ("Most large and important dealers are members of the club, but they do not usually conduct their business in the club's trading hall . . . large scale transactions tend to be consummated in private offices."). On the strategy of degradation, see Jacques Cremer et al., *Connectivity in the Commercial Internet*, 48 J. INDUS. ECON. 433 (2000); and Aviram, *supra* note 8, at 39-45.

119. The relative enforcement costs of the game types were assessed in discussing each game type. See *supra* Part III.

network members) is less interesting than investigating those that serve valuable functions.

Variance of benefits is often reflected in game types. For example, Battle of the Sexes is, as mentioned earlier, a Meeting Place game with an added feature of variance in the benefits from mutual behavior (i.e., both players prefer {C, C} and {D, D} over the other outcomes, but one player prefers {C, C} over {D, D}, while the other prefers {D, D} over {C, C}).

Market structure affects enforcement costs both at the network level (the amount of competition among regulating networks) and at the member level (the relative power of members within a network). At the network level, the effects of inter-network competition have been thoroughly discussed in the antitrust<sup>120</sup> and in corporations law literature,<sup>121</sup> and less so in the private ordering literature. At the network member level, market structure affects the likelihood of a member's degrading connectivity with the network (e.g., disobeying the network's rules, transacting outside of the network and thus weakening the network's enforcement mechanisms, etc.), which in turn increases enforcement costs.<sup>122</sup>

Market structure also often affects the game type of the norm. For example, a Chicken game is more likely to be played in oligopolistic market structures in which there are few players, each possessing significant and approximately equal market power (e.g., a social network in a small, rural community), rather than among many players each of whom possesses little market power, or a few unequally powerful players. In contrast, a Bully game is more likely to characterize payoffs when the market contains one player that is markedly more powerful than the others. It is this power (and hence lesser vulnerability) that enables that player to credibly threaten to play "Deadlock" rather than "Chicken"; weaker players would like to bluff and masquerade as Deadlock players, but without market power they cannot credibly persuade their rivals that they will default even when the more powerful players threaten to default as well (e.g., that they will engage in a price war even if their more powerful

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120. See, e.g., William E. Cohen, *Competition and Foreclosure in the Context of Installed Base and Compatibility Effects*, 64 ANTITRUST L.J. 535 (1996); William J. Kolasky, *Network Effects: A Contrarian View*, 7 GEO. MASON L. REV. 577 (1999); Mark A. Lemley & David McGowan, *Legal Implications of Network Economic Effects*, 86 CAL. L. REV. 479, 500-23 (1998); Thomas A. Piraino, Jr., *The Antitrust Analysis of Network Joint Ventures*, 47 HASTINGS L.J. 5 (1995).

121. See, e.g., Lucian Arye Bebchuk & Mark J. Roe, *A Theory of Path Dependence in Corporate Ownership and Governance*, 52 STAN. L. REV. 127, 141 (1999) (arguing that network effects may induce persistence of preexisting corporate structures); Michael Klausner, *Corporations, Corporate Law and Networks of Contracts*, 81 VA. L. REV. 757 (1995) (discussing the presence and effects of network externalities in corporate contracts); Larry E. Ribstein & Bruce H. Kobayashi, *Choice of Form and Network Externalities*, 43 WM. & MARY L. REV. 79 (2001) (presenting empirical evidence that the choice of incorporation form (e.g., partnership, LLP, LLC, corporation) is driven not by network lock-in effects but by relative business advantages of a given form over the other forms).

122. See *supra* note 117.



rivals posture to do the same).<sup>123</sup>

Game types, therefore, are a key criterion in determining enforcement costs; yet this criterion has not been addressed by the literature on collusion.<sup>124</sup> In assessing the enforcement costs of norms, the remainder of this Article will give the most attention to the game type criterion, although other criteria will be considered as well. In what follows, I examine case studies, most of which are leading works in the private ordering scholarship. The next Section will discuss case studies of norms characterized by the lowest-enforcement-cost game types: Harmony and Meeting Place. Since norms characterized by low enforcement costs are likely to survive spontaneous formation and develop effective enforcement mechanisms, it is no surprise that they become foundations for more elaborate, and more expensive to enforce, PLSs. The final Subsection of this Section will address norms characterized by higher-enforcement-cost game types: Battle of the Sexes, Stag Hunt, Chicken, Bully, and Prisoner's Dilemma.

#### *B. Low-Enforcement-Cost Norms: The Foundations of Private Ordering*

Very little of the private ordering literature pays attention to norms characterized by the lowest-enforcement-cost games: Harmony and Meeting Place. One reason may be that due to the low enforcement costs, the enforcement mechanisms do not need to be very elaborate. At the extreme, the least-cost game—Harmony—does not need any enforcement whatsoever, since both players will always choose action “C” (cooperation) without regard to what the other player does.<sup>125</sup> As a result, neither coercion nor even information exchange is necessary to ensure mutual cooperation.

Norms characterized by the Meeting Place game are pervasive in our lives, and as this Article argues, they form the nucleus of more elaborate, and more expensive to enforce PLSs. The most ubiquitous Meeting Place norm is facilitating social interaction in a social network. In most cases, people are

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123. There are numerous other structural issues that affect game type. For example, the choice between a Meeting Place game and a Battle of the Sexes game could depend on whether this is the first time the norm in question is set, or whether there are competing norms to choose from. If there are competing norms, most likely each network member has some costs associated with switching to the other norm. As a result, the member will have a preference for the incumbent norm, even if it would as second preference follow another norm rather than be the only one using the incumbent norm while all others used the other one. This is a Battle of the Sexes payoff structure. In contrast, if no member has adopted an existing norm, they may be indifferent among norm alternatives, as long as one norm is agreed upon and adopted universally. This is a Meeting Place payoff structure.

124. For a proposed explanation of the reason that the cartel stability literature did not address the game type criterion, see *supra* Section II.C.

125. See, e.g., Licht, *supra* note 81, at 109 (“[O]ne may distinguish between ‘playing C’ in the Harmony game and ‘cooperation,’ where cooperation requires that the actions of parties—which are not in preexistent harmony—be brought into conformity with one another through negotiation. In its pure form, Harmony does not call for any cooperation in the sense of conscious policy coordination, as the players independently converge to the desired CC outcome.” (footnote omitted)).

indifferent (within a certain range of alternatives) to the choice of location of interaction, type of interaction, etc. If these alternatives would be considered the “C” and “D” actions, each participating player is indifferent between {C, C} and {D, D}. Social interaction requires, however, that both (or all) players choose the same alternative; the players will not beneficially interact if they arrive at different locations, or if one expects a swimming competition while the other expects a debate match to take place. Therefore, {C, D} and {D, C} are both worse than the alternatives that leave the members in the same place. This is precisely the Meeting Place game structure.

Similarly, members of religious networks, at least in many places and eras of the past, tend to act as if they have Meeting Place preferences. Unlike other Meeting Place games that were discussed earlier, religious preferences are not openly acknowledged by the religion’s members or adherents; the very notion of “preferences” regarding the content of religious norms might seem inimical to sincere belief in the objective rightness of those norms. Thus, a believer would not typically prefer to switch religions merely because the other members of the community have switched. But most (if not all) faiths confer on certain institutions or office holders (e.g., the Pope, individual members of the clergy, an assembly of the clergy, etc.) the power to interpret or dictate religious norms. Even in religions that do not confer quasi-judicial or legislative authority on their clergy, the views of religious leaders on religious matters are regarded by believers as compelling. For most believers, therefore, there is a strong preference for following the norms as interpreted by the religious leader or institution. This preference is similar to (though held for different reasons than) the preference of a Meeting Place player to follow the location choice of the other player.<sup>126</sup>

Given the vast variety of social and religious networks and of people’s preferences in these realms, the assumption that network members’ preferences are those of player of the Meeting Place game is not always correct. Some people enjoy being mavericks, which in game terms means preferring {C, D} and {D, C} over the other outcomes. More commonly, people do have a certain preference as to specifics of the religious doctrine or social interaction (e.g., preferring to talk about sports rather than politics or vice versa). In such cases, the social or religious network will be characterized by the moderately costly Battle of the Sexes game, rather than the Meeting Place game. But, as previously mentioned, people tend to seek the lowest-cost regulator. As a

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126. In other words, most believers prefer {C, C} and {D, D} over other outcomes, which is a trait of both Meeting Place and Battle of the Sexes games. Furthermore, within the realm of religious norms most believers trust the judgment of the leader or institution empowered by that religion to interpret norms, and therefore do not feel that they are better off under one doctrine rather than another, as long as they follow the doctrine deemed correct by the leader or institution (i.e., in game terms, they are indifferent between {C, C} and {D, D}, which is the trait of a Meeting Place game but not a Battle of the Sexes game).

result, groups are likely to expel some members and invite others, so that within a network, preferences are similar, and thus the characterizing game type is Harmony or Meeting Place, not Battle of the Sexes. Therefore, people interested in talking about sports will likely find a social network in which members are most interested in talking about sports. It would often be more costly to have within such a network people who dislike sports and want to talk about politics—even if both groups prefer talking to anyone about anything over talking about their preferred subjects to themselves, they would still be better off finding a group interested in addressing the same interests.<sup>127</sup> Thus, social, religious, and other similar networks are likely to evolve in a manner that reduces the cost of enforcing the most beneficial interaction by shifting from the Battle of the Sexes game type to Harmony and Meeting Place game types.

These low-enforcement-cost networks are the building blocks of PLSs. Their low enforcement costs are due not only to being Harmony or Meeting Place games, but also to the high average utility people derive from social and spiritual interaction. Social and religious networks also tend to be more egalitarian—people cannot monopolize social networks as they can monopolize markets, and though some people carry more weight than others in social and religious circles, on average these networks are characterized by lower concentration (and sometimes by lower barriers to entry) than, say, diamond exchanges.

Social and religious networks overcome another factor that raises enforcement costs—competition among networks—by increasing switching costs between networks.<sup>128</sup> One way to increase switching costs is by developing unique cultures common to the members of a network.<sup>129</sup> Since the nuances of common cultures are costly and time-consuming to learn, and the lack of familiarity in them is easy to detect, they present a relationship-specific investment in a specific social or religious network. A network member

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127. Of course, these people might not always find alternative groups that provide the same utility. A sparsely populated area may not have a great variety of social groups or a sufficient number of people to form a wide variety of groups. Furthermore, network effects in larger groups or other benefits of a specific group may outweigh the benefit of creating a separate group for each social or religious preference.

128. See, e.g., Greif et al., *supra* note 13, at 757-58.

These guilds, therefore, were able to provide their members with streams of rents in their hometowns. Receiving these rents, however, could have been made conditional on following the recommendations, rules, and directives of the guild. Hence these rents could serve to tie a member to the guild by making change of residence costly and to ensure solidarity among the guild's members.

*Id.*

129. Of course, reducing competition among networks is just one of the reasons for creating a common culture within a group, and possibly not the leading one. There are other reasons for the creation of a common culture, including satisfying a need to feel associated with a group. Regardless of the reason, the existence of a common culture reduces competition among social and religious networks and thus reduces the enforcement costs of the network.

considering disobeying the norms regulated by the network will lose the investment she made in learning the network's culture, and will have to make a new investment in learning the culture of whatever other network she joins. In the meantime, she will be identified by the new network as an outsider.<sup>130</sup> Ethnicity-based groups form an even tighter barrier—a person cannot change ethnicity, and therefore one cannot replace an affiliation with an ethnic network which one left or from which one was expelled.<sup>131</sup>

The private ordering literature notes the importance of reputation in facilitating PLSs.<sup>132</sup> Yet this scholarship often fails to note that the disciplining effect of reputation depends on the group in which this reputation is earned. As discussed in the Pax Dei context, creating a reputation mechanism in a spontaneously formed PLS may be futile because, if the system fails, any reputation created within it will not continue to have meaning outside of the defunct PLS in which it gained currency. However, when a preexisting, low-enforcement-cost system, such as a social network, expands and uses its information mechanism (e.g., reputation within the social network) to enforce a higher-cost norm, this reputation has an effect even after the failure of the higher-cost norm (restricting warfare, in the Pax Dei case), since the social network is stable and will continue to exist indefinitely. Thus, a warlord who has acquired a poor reputation may suffer ostracism from the social or religious network even if, and after, the high-cost norm (restricting warfare) has failed. In other words, reputation in itself cannot enforce norms. Reputation is able to enforce norms only if it affects interactions in a vibrant network that provides important benefits to the party carrying the reputation. When a PLS is in its infancy and does not yet confer significant benefits to its members, reputation must affect interaction in some other preexisting network.

One might argue that religious networks govern not by providing for people's spiritual needs, but by invoking the power of God. According to this critique, there is something unique about the belief that one is abiding to the will of an omnipotent being, and it is fear of God (or of hell) that makes one willing to voluntarily follow a course of action that would otherwise not be contemplated. But this cannot be a complete answer to the effectiveness of religious networks, even in the highly religious (and superstitious) society of tenth-century Europe. Some warlords must have been cynical about the

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130. On viewing people as outsiders, even a decade after they joined a community, see Ellickson, *supra* note 13, at 678 ("As the Association President later explained in a hearing before the county Board of Supervisors, the problem was that Ellis, a country resident for a decade, 'hasn't been [in the County] all that long.'").

131. As Richard Posner observes, some primitive societies have bypassed the non-duplicability of kinship by instituting "barter friendships," which oblige the parties to standards of loyalty similar to those they owe their kinsmen. See Richard A. Posner, *A Theory of Primitive Society, with Special Reference to Law*, 23 J. LAW & ECON. 1 (1980).

132. See *supra* notes 31-33.

likelihood of divine repercussions for refusing Pax Dei. These cynics had much to gain if they refused to adhere to the oaths while other warlords abided by them (after all, if this is a Prisoner's Dilemma game and the other player is going to cooperate, a defaulting warlord would find himself in the outcome that is best for him). Other warlords may have thought that divine will supports any means of accession to power; after all, people are prone to adopt views the consequences of which are favorable to them.

Anecdotal evidence also suggests that the threat of divine sanction was not a panacea against norm violation, nor a necessary ingredient for stable PLSs. Some important PLSs from approximately the same era were facilitated by non-religious mechanisms. For example, the *lex mercatoria*, the medieval customary law of merchants, was enforced by secular, merchant courts. A merchant who ignored their decrees would risk reputational sanctions that likely would cause most merchants to refuse to do business with the offender.<sup>133</sup> Furthermore, the threat of divine sanction very often failed to direct behavior and resolve disputes, even in the Middle Ages, and even when the parties involved were the clergy. For example, the Catholic Church's legal machinery failed to resolve or prevent the Great Schism, in which two cardinals claimed to hold the position of Pope.<sup>134</sup> Finally, a General Council of prelates convened, forced out the two popes, and elected another pope.<sup>135</sup> This General Council was the backbone of the network that provided spiritual services, and was itself a social network. If fear of divine sanctions motivated the people, then a decree from God's agent on earth (whichever of the popes a person believed was legitimate) would determine this conflict. Rather, the mobilization of the bulk of the social/religious network suggests that it was the support of this network that was crucial to any resolution of the conflict.

Low-enforcement-cost norms have received very modest attention in the private ordering community. Richard McAdams discusses the importance of the social network in forming and regulating norms. His esteem theory of norms argues that people are induced to cooperate by receiving esteem from

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133. See, e.g., Eyal Benvenisti, *Exit and Voice in the Age of Globalization*, 98 MICH. L. REV. 167, 176 n.35 (1999); Lisa Bernstein, *Merchant Law in a Merchant Court: Rethinking the Code's Search for Imminent Business Norms*, 144 U. PA. L. REV. 1765 (1996); Paul R. Milgrom et al., *The Role of Institutions in the Revival of Trade: The Law Merchant, Private Judges, and the Champagne Fairs*, 2 J. ECON. & POL. 1 (1990). An important reason for the inability of the law merchant to rely on religious enforcement was that the merchants governed by it were of different religious persuasions. This did not, however, prevent the formation of a stable PLS, enforced by other social networks.

134. *The Great Schism: Council of Pisa, Competency to Try Popes, 1409*, in A SOURCE BOOK FOR MEDIEVAL HISTORY 327-28 (Oliver J. Thatcher & Edgar Holmes McNeal eds., 1905), available at <http://www.fordham.edu/halsall/source/grtschism3.html>; *The Great Schism: Manifesto of the Revolting Cardinals, Aug 5, 1378*, in A SOURCE BOOK FOR MEDIEVAL HISTORY, *supra*, at 326-27, available at <http://www.fordham.edu/halsall/source/grtschism1.html>; *The Great Schism: University of Paris and the Schism, 1393*, in A SOURCE BOOK FOR MEDIEVAL HISTORY, *supra*, at 326-27, available at <http://www.fordham.edu/halsall/source/grtschism2.html>.

135. See, e.g., *Decrees of the Ecumenical Councils: Council of Constance 1414-18* (Norman P. Tanner ed.), at <http://www.piar.hu/councils/ecum16.htm> (last visited Oct. 8, 2003).

the group—a non-material good that is connected to one's status within a group.<sup>136</sup> The groups McAdams refers to are generally ones that this Article describes as Harmony or Meeting Place games: usually, social networks. The advantage of esteem as a regulating mechanism, according to McAdams, is that esteem sanctions are very inexpensive for each group member to administer.<sup>137</sup> Again, this argument is in the same vein as the proposition that the Harmony and Meeting Place networks are the least-cost enforcers. McAdams adds another feature that enhances compliance: esteem competition. Esteem is relative, and thus compliance by some people raises the cost of non-compliance for the others, since the esteem collected by the compliant parties devalues the group status of non-complying members.<sup>138</sup>

McAdams' esteem theory does not differentiate between groups, however, and as a result does not address the evolutionary pattern of PLSs described in this Article. As discussed above, different groups (i.e., regulating networks) have widely varying enforcement costs. Low-enforcement-cost norms (and the networks that enforce them) are the only ones that are likely to survive spontaneous formation; they expand to encompass other, more expensive-to-enforce norms; this expansion, in turn, strengthens their enforcement mechanisms. The next Section will examine the more expensive-to-enforce game types and the private ordering literature that addresses them.

### *C. High-Enforcement-Cost Norms: Gradual Evolution of Private Ordering*

The private ordering literature on norms that are more expensive to enforce is much richer than that on low-cost norms. The high cost norms tend to be more elaborate and to more closely resemble the public legal system. This subsection reviews case studies from the private ordering literature and examines how expensive-to-enforce norms usually evolve from Harmony or Meeting Place type of norms. These norms include moderately expensive

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136. See Richard H. McAdams, *Cooperation and Conflict: The Economics of Group Status Production and Race Discrimination*, 108 HARV. L. REV. 1003, 1019 (1995). McAdams asks:

If neither material self-interest nor altruism explains the residuum of cooperation, what can? And why does the level of cooperation vary so significantly with the manner in which individuals are categorized by group? This section proposes an answer: group-based status production. In the experiments discussed above, individuals behave selfishly, not altruistically, but their selfish end is the production of the non-material good of esteem. If individuals seek such non-material ends, members of social groups have another means of solving collective action problems—by allocating esteem to induce members to make contributions to group welfare.

*Id.* at 1019.

137. McAdams, *supra* note 5, at 365 (1997) (“The key feature of esteem is that individuals do not always bear a cost by granting different levels of esteem to others. Because the cost is often zero, esteem sanctions are not necessarily subject to the second-order collective action problem that makes the explanation of norms difficult.”).

138. *Id.* at 366 (“Because the desire for esteem is relative, competition for esteem can progressively raise the standard the norm imposes.”).

Battle of the Sexes norms such as those facilitating exchanges<sup>139</sup> and merchant coalitions,<sup>140</sup> as well as more expensive, Chicken and Prisoner's Dilemma norms such as prohibiting opportunistic behavior in exchanges,<sup>141</sup> restricting warfare, and resolving trespass disputes between neighbors.<sup>142</sup>

Networks facilitating low-enforcement-cost norms are not always available, however. In some cases, a moderately expensive game type (such as Battle of the Sexes) requires disciplining a group of individuals that are not all members of any single low-enforcement-cost network (such as a social or religious group), and therefore none of the inexpensive networks can evolve to attend to the moderately expensive norm. For example, traders from different regions and religions may not share a single social or religious network that could expand to regulate trading interaction. In merchant coalitions in Mexican California<sup>143</sup> and pre-Hanseatic League German Kontore (merchant organizations),<sup>144</sup> for example, regulating networks managed to form spontaneously despite the lack of a low-enforcement-cost foundation. However, as discussed later in this Section,<sup>145</sup> these PLSs were not very effective, and could not evolve to regulate higher-enforcement-cost norms such as coordinating a multilateral punishment. This led, in the case of the German merchants, to the formation of the Hanseatic League—an expansion of the underlying, low-enforcement-cost norms facilitating social interaction to cover the individuals who needed regulation of a higher-cost norm (collective boycott aimed to force foreign cities to provide security to member merchants). Once formed, the Hanseatic League quickly evolved to form a more effective replacement for the pre-League Kontore. These findings support the theory, espoused in Part II, that PLSs are not stable when they form spontaneously, but will achieve stability if they are based on networks that facilitate low-enforcement-cost norms.

Merchant coalitions and exchanges typically exhibit Battle of the Sexes characteristics. Merchant coalitions, for example, protect participating merchants from being defrauded by their agents by conveying information on prospective agents' honesty, and possibly by coordinating a boycott of dishonest merchants.<sup>146</sup> Different merchants have differing vulnerabilities to agent dishonesty. Some think they are better at identifying honest agents;

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139. For example, diamond exchanges described in Bernstein, *supra* note 9; and Bernstein, *supra* note 23.

140. Such as the Maghribi traders' coalition described in Greif, *supra* note 9, and Greif, *supra* note 28.

141. Bernstein, *supra* note 9; Bernstein, *supra* note 23.

142. ORDER WITHOUT LAW, *supra* note 9; Ellickson, *supra* note 13.

143. See Clay, *supra* note 9.

144. See Greif et al., *supra* note 13.

145. See *infra* text at notes 183-196.

146. See, e.g., Clay, *supra* note 9, at 203; Greif, *supra* note 9, at 526; Greif, *supra* note 28, at 858-59.

others do not use agents very frequently, or only use trusted family members as agents. As a result, there is a disparity in how different merchants view the risk of agent dishonesty, and hence the investment they are willing to make in the coalition to reduce this problem.

In this case, the “C” action would be a large investment in identifying and punishing dishonest agents, perhaps including a duty to refrain from dealing with any agent the coalition deems dishonest, no matter how profitable dealing with him may be to a specific merchant. The “D” action would be a small investment in identifying dishonest agents. The more vulnerable merchants will prefer a {C, C} outcome over all others, while their less vulnerable counterparts will prefer a {D, D} outcome. However, both would opt for either of the mutual outcomes rather than disagreement, {C, D} or {D, C}, in which case no coalition will form and each merchant will have to fend for himself—the worst outcome for all merchants. This is a Battle of the Sexes preference set.<sup>147</sup>

Like merchant coalitions, exchanges exhibit Battle of the Sexes characteristics. Any given norms of trading favor some over others. Smaller merchants lacking facilities to operate twenty-four hours a day prefer to limit the scope of time in which trading is possible.<sup>148</sup> Other traders might benefit from certain trading systems and be harmed by alternative trading systems. Again, however, because of the network effects involved in having a large market, most members would rather trade in a larger, more liquid market with somewhat less favorable trading rules, than in a small, illiquid market that uses the rules most favorable to them.

In some cases, like the social and religious groups described in the previous Section, markets split in order to accommodate the preferences of smaller groups and turn the network’s characteristic game type into Harmony or Meeting Place. However, this is less frequent in exchanges and merchant coalitions, perhaps because network effects tend to peak earlier in social and religious groups. In contrast, the network effects of an exchange are still large enough to outweigh the greater enforcement costs of regulating the heterogeneous preferences of the members. Such splitting may also be less frequent because the maintenance of a market, which is a Battle of the Sexes norm, is closely tied to a more expensive Prisoner’s Dilemma norm—that of mitigating opportunistic behavior in transactions within the market. Mitigating opportunism is characterized by the Prisoner’s Dilemma game because each merchant would most like to be able to be opportunistic while others are not. As a second preference, she would prefer that neither she nor others are

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147. See *supra* Section III.C.

148. See, for example, Justice Brandeis’s reasoning in *Chicago Board of Trade v. United States*, 246 U.S. 231 (1918). For a critique of this reasoning, see ROBERT H. BORK, *THE ANTITRUST PARADOX* 41-47 (1993).



opportunistic. Her third preference is that both she and the others are opportunistic—because, if everyone else is acting opportunistically, she'd be a fool not to, wouldn't she? This, of course, is the preference set for a Prisoner's Dilemma game.

Since markets often undertake to both facilitate exchange (a Battle of the Sexes norm) and mitigate opportunism (a Prisoner's Dilemma norm), splitting a market so as to reduce preference heterogeneity among members will not reduce enforcement costs since it does not reduce significantly the costs associated with mitigating opportunism. More importantly, scaling down and reducing preference heterogeneity is usually made unnecessary because the higher-cost norms—maintaining a market and reducing opportunism in it—can be regulated by evolving a lower-cost regulator, typically a social or religious network. For example, Janet Landa discusses trading relationships within an ethnically homogeneous group of Chinese traders engaged in the marketing of rubber in Singapore and West Malaysia, and explains how homogeneity facilitates more efficient trading among the group's members.<sup>149</sup> Similarly, Lisa Bernstein's important study of diamond exchanges observes that the diamond industry has been dominated by Orthodox Jews,<sup>150</sup> Jewish law,<sup>151</sup> religious courts,<sup>152</sup> and social activities.<sup>153</sup>

Barak Richman expands Bernstein's insights, making a direct connection between the social/religious network of Orthodox Jews and the mitigation of opportunism in diamond dealing.<sup>154</sup> Forming a model that takes into account network effects of religious goods provided by the Orthodox Jewish community,<sup>155</sup> Richman exposes how religious obligations encompass

149. Janet T. Landa, *A Theory of The Ethnically Homogenous Middleman Group: An Institutional Alternative to Contract Law*, 10 J. LEG. STUD. 349 (1981).

150. See Bernstein, *supra* note 9, at 140 ("Because the diamond industry has long been dominated by Orthodox Jews, it was able to take advantage of the existence of these conditions.").

151. *Id.* at 141 ("Jewish law provided detailed substantive rules of commercial behavior. . . Jewish law also provides rules governing the making of oral contracts and lays down rules for conducting commercial arbitration. In the diamond industry, Jewish law provided a code of commercial fair dealing.").

152. *Id.* ("[T]he Jewish community provided an array of extralegal dispute resolution institutions. . . . [U]nder Jewish law, a Jew is forbidden to voluntarily go into the courts of non-Jews to resolve commercial disputes with another Jew. Should he do so, he is to be ridiculed and shamed.").

153. *Id.* at 139. Bernstein writes:

The Diamond Dealers Club still functions like an old-fashioned mutual-aid society. It provides kosher restaurants for its members. A Jewish health organization provides emergency medical services, and social committees are organized by neighborhood to visit sick members and their families. There is a synagogue on the premises, and contributions to a benevolent fund are required. Group discounts on packaged family vacations are also available so that members' families can travel together during the month that the bourse is closed.

*Id.*

154. BARAK D. RICHMAN, COMMUNITY ENFORCEMENT OF INFORMAL CONTRACTS: JEWISH DIAMOND MERCHANTS IN NEW YORK (HARVARD JOHN M. OLIN DISCUSSION PAPER NO. 384, 2002), at <http://papers.ssrn.com/abstract=349040>.

155. Richman notes:

[T]he Ultra-Orthodox preference for religious goods fits very comfortably into the notion of a

contractual compliance and fair disclosure,<sup>156</sup> and how the religious community's institutions enforce commercial norms,<sup>157</sup> sometimes with extreme subtlety.<sup>158</sup> The regulation of a high-enforcement-cost norm (such as mitigating opportunistic behavior) can be done jointly by more than one preexisting network. For example, Richman points to dual, symbiotic regulation of diamond dealing by both the social and the religious networks.<sup>159</sup>

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utility function. They truly gain enjoyment—the definition of utility—by participating in religious activities such as attending synagogue, studying religious texts, and performing holiday or life-cycle rituals. Moreover, *many of these activities require the participation of fellow community members, thus one member's enjoyment from these activities is partly dependent on the character of his colleagues.*

*Id.* at 34–35 (emphasis added).

156. Thus:

Complying with contractual obligations thus take [sic] on an awesome, divine quality. Fulfilling one's contractual obligations is an act that, like other religious behavior, is commanded by the divine law. . . . Jewish legal commandments for ethical behavior in commerce extend beyond contract compliance. The doctrine of the 'just price' and the theory of 'misrepresentation' also use religious language and divine incentives to compel efficient behavior. The just price doctrine led to strict rules for accurate weights and measures. . . . Ultra-Orthodox merchants view their actions as a part of moral example they assume as members of a religious community.

*Id.* at 35–38.

157. Thus:

One blunt instrument is to use rabbinical courts to excommunicate an offender. . . . Rabbinical courts are more likely to impose less severe measures, such as stripping an individual of a community honor . . . or an order to make a charitable contribution to a community charity. Nonetheless, the mere power to excommunicate, even if it is rarely invoked, is probably the most effective instrument the rabbinic courts have to induce cooperation. The [New York Diamond Dealers Club] arbitration committee itself can initiate a proceeding in a rabbinical court, and the close connection between the two forums illustrates the diamond industry's reliance on community institutions to help enforce contracts. Less formal institutions also play a role in enforcing contractual compliance. When the community is familiar with a member's failure to comply with contractual obligations, a withholding of excludable community goods . . . often occurs. Excludable religious goods include participation roles in daily prayer, honors in life-cycle ceremonies, and access to classes or teachers that are in limited supply or enrollment in particularly select educational institutions. . . . Hovering throughout those specific goods is community respect. . . . One outstanding expression of community respect pertains to how easily—and with how prominent a family—parents can arrange their children to marriage.

*Id.* at 38–41.

158. Richman quotes an unidentified diamond merchant:

It really doesn't happen very often, but sometimes an individual has poor judgment and is unable to deliver on a business promise. . . . We don't try to punish him—you have to understand the financial pressures that come with the business and with the burdens of raising a large family. But we remember. So he probably doesn't get *Shishi* [the sixth Torah reading in Sabbath services, which is considered a great honor among many Ultra-Orthodox].

*Id.* at 40. This withdrawal of but a few community goods allows more proportional and incremental sanctions than do the public (and many alternative private) legal systems.

159. Thus:

The threat of flight from the community, though extremely unlikely, is possible, and Ultra-Orthodox communities do watch some members leave for less observant communities or other Ultra-Orthodox sects. Such defections from the community can dilute the effectiveness of community enforcement, and membership in the Ultra-Orthodox community may be a necessary but not a sufficient condition to induce sufficient confidence that a given community member is trustworthy with another's diamonds. Accordingly, diamond merchants will look for other assurances that will keep a diamond contractor committed to cooperation,

Proscribing opportunism is a high-enforcement-cost, Prisoner's Dilemma norm; absent enforcement, one would be better off acting opportunistically whether or not others do so, but the socially optimal situation is mutual honesty. Bernstein's and Richman's papers describe the network that undertook this norm, and demonstrate how the preexisting social and religious networks (which enforce low-enforcement-cost norms) were tapped to successfully enforce the anti-opportunism norm. These findings corroborate this Article's expectation that high-enforcement-cost norms (such as mitigating opportunistic behavior in commercial transactions) will be regulated by networks that originally regulated low-enforcement-cost norms (such as social and religious networks).

Low-enforcement-cost norms evolve to regulate not only Battle of the Sexes and Prisoner's Dilemma type norms, but also Bully and Chicken games. Robert Ellickson's influential work on the resolution of cattle trespass disputes among neighbors in rural Shasta County provides a lucid example.<sup>160</sup> Some residents of Shasta County own large numbers of cattle, and graze them in the "traditional" way, by letting let them roam freely in unfenced areas.<sup>161</sup> The cattle occasionally stray into neighbors' lands, destroying gardens and otherwise harming the property. Since it is not realistic for a rancher to control his cattle, preventing the cattle from trespassing requires either that the cattle be fenced in, or that the neighbors' properties be fenced out.

The interaction between two ranchers who graze cattle traditionally is (roughly) characterized by the Chicken game. Each rancher would most want his neighbor to fence his lands (action "C"), while he does not fence (action "D"). This would prevent most trespass incidents by fencing his cattle out of his neighbor's property and the neighbor's cattle out of his property. The rancher may be indifferent between {C, C} and {C, D}, with perhaps a slight

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such as a merchant's family or social connections to the community.

*Id.* at 37. See also *id.* (citing Eli Berman, *Sect, Subsidy and Sacrifice: An Economist's View of Ultra-Orthodox Jews*, 115 Q. J. ECON. 905 (2000)) (discussing expectations within the Ultra-Orthodox Jewish community that a male will remain a full-time student of religious studies for several years after he has begun a family, so that by the time he assumes economic responsibilities, he has a spouse and children entrenched in the community, and thus is less likely to depart and is deemed more trustworthy).

160. Ellickson developed a specific game to describe the relationship between the ranchers in Shasta County. See ORDER WITHOUT LAW, *supra* note 9, at 162-64. This game, which he called "specialized labor," has the following payoff structure:

	Build fence	Shirk
Build fence	3, 3	0, 7
Shirk	7, -2	1, 1

While this game may be more refined for the specifics of Shasta County trespass disputes, the Chicken and Bully games also fit the situation reasonably well. Since this Article attempts a preliminary study of the implications of game types on a norm's enforcement costs (and thus on the evolution of PLSs), the analysis focuses on generic games that are comparable across many different case studies.

161. Ellickson, *supra* note 13, at 637-38. Compare these "traditionalists" to the "modernists," who keep their cattle fenced and use sprinklers to maintain the ranchland vegetation during the summer. *Id.* at 638-39.

preference for mutual cooperation, as double fencing might eliminate an occasional trespass that a single fence did not. Finally, the worst outcome for the rancher is {D, D}, since the damage from the neighbor's cattle trespassing on his property is greater than the cost of fencing the neighbor's cattle out.

But not all farmers pose equal risks of cattle trespass. Ellickson notes that some ranchers fence their cattle,<sup>162</sup> and some others are ranchette owners who do not raise cattle (or at least not a significant number of cattle) and only pose a slight risk of trespass by their horse or dog.<sup>163</sup> The asymmetrical risks change the preference ranking of the riskier rancher. Not fearing being a victim of trespass, he would prefer that neither party fence (i.e., {D, D}) rather than fence ({C, C} and {C, D}). His preference order, {D, C}, {D, D}, {C, C}, {C, D}, is that of a Deadlock player. The other, vulnerable rancher or ranchette owner still maintains the Chicken player's preferences. The result, as discussed above,<sup>164</sup> is a Bully game.

Both of these are high-enforcement-cost games, and the fact that different residents of Shasta County pose widely different risks of trespass also raises enforcement costs. Thus, absent low-enforcement-cost foundations it would have been very difficult, if at all possible, to spontaneously form a network regulating the prevention and resolution of trespass disputes. On the other hand, the people affected by these disputes are geographically concentrated in one region, and are almost entirely within a single social network.<sup>165</sup> Furthermore, several structural features of the social network in Shasta County reduce its enforcement costs. First and foremost, there are no real competitive alternatives to the social network; the area is not densely populated, and people in the area seem to belong to a single social circle. Second, though the population in the area has grown over time, most families have been in the area for a long time—often several generations—increasing the investment they have in the social network.<sup>166</sup> Third, the population is relatively homogenous in

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162. *Id.* at 638-39.

163. *Id.* at 636 ("Ranchette owners may keep a farm animal or two as a hobby, but few of them make significant income from agriculture."); *id.* at 674 ("Even the ranchette owners have, if not a few hobby livestock, at least several dogs, which they keep for companionship, security, and pest control. Unlike cattle, dogs that trespass may harass, or even kill, other farm animals.").

164. See *supra* Section III.F.

165. See Ellickson, *supra* note 13, at 676-77. The people who are on the edge of the social network and least connected to it are usually those who disobey the cattle trespass norms most frequently. *Id.* at 685 ("In both instances [of trespass lawsuits] neither the trespass victim nor the cattle owner was well-socialized in rural Shasta County norms. Thus other respondents tended to refer to the four individuals involved in these two claims as 'bad apples,' 'odd ducks,' or otherwise as people not aware of the natural working order.").

166. *Id.* at 634 ("Approximately half of these ranches are owned by descendants of families that have been in the county for several generations."). Ellickson also writes:

People tend to know one another, and they value their reputations in the community. Some ranching families have lived in the area for several generations and plan to stay indefinitely. Members of these families seem particularly intent on maintaining their reputations as good neighbors. Should one of them not promptly and courteously retrieve an estray, he might fear

its power—generally, none of the families can force their will on other families. Physical violence is very limited, and in the rare cases that it occurs, seems to be aimed at a trespassing cattle and serves as punishment for the trespass,<sup>167</sup> not as intimidation. Political battles are also complex, and no family or group of families has control over such political struggles as decisions on ordinances affecting cattle trespass liability.<sup>168</sup> Finally, the issue of cattle trespass is, on average, important to the members of the social network, so the average utility from regulating the matter is significant.

It should come as no surprise, therefore, that the social network has evolved to regulate cattle trespass matters. Ellickson's work does not focus on the chronological evolution of the norms, so it is not possible to demonstrate from his work the chronological path that this Article's theory anticipates. It is clear, however, that the social network has enforced other, lower-cost norms; members of the social network interact on "water supply, controlled burns, fence repairs, social events, staffing the volunteer fire department," etc.<sup>169</sup> Some of the norms facilitating these interactions are lower-cost than the expensive-to-enforce Bully and Chicken games. By and large, the social network manages to contain disputes, and the norm is not to act on a single incident of trespass, but only on a chronic imbalance of behavior (i.e., repeated incidents of being harmed by the neighbor, without sufficient redeeming occasions in which either the person received a favor from his neighbor, or the person harmed the neighbor).<sup>170</sup> When discipline is necessary, the main disciplinary action is spreading negative gossip. As Ellickson explains: "This usually works because only the extreme deviants are immune from the general obsession with neighborliness."<sup>171</sup>

Furthermore, it is very clear that the social network—the concept of neighborliness—is the key motivation of cooperation. Many of the ranchers quoted by Ellickson stress the neighborliness theme.<sup>172</sup> One cattleman states: "I think the whole thing is good neighbors. If you don't have good neighbors, you can forget the whole thing."<sup>173</sup>

Shasta County presents a case study in which the enforcement costs of the low-cost nucleus are unusually low. In contrast, when the low-cost nucleus is weak or non-existent, some PLSs regulating moderate-enforcement-cost norms

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that any resulting gossip would permanently besmirch the family name.

*Id.* at 677.

167. *Id.* at 678-79.

168. Consider Ellickson's description of the politics of issuing closed-range ordinances, *id.* at 643-53.

169. *Id.* at 675.

170. *Id.* at 673-76.

171. *Id.* at 677.

172. *Id.* at 681 ("Tony Morton: '[I never press a monetary claim because] I try to be a good neighbor.' Norman Wagoner: 'Being good neighbors means no lawsuits.'").

173. *Id.* at 624 (quoting Chuck Searle).

manage to form spontaneously, but their enforcement abilities are poor and they often either ultimately fail or are at least unable to evolve to regulate higher-cost norms. Compare two observations on merchant coalitions—Avner Greif's work on Maghribi traders in the medieval Mediterranean Sea and Karen Clay's work on merchants in 1830s Mexican California. Greif describes a merchant coalition of Maghribi traders, a group of Jewish merchants who originally lived in the Abbasid caliphate (centered in Baghdad), and then migrated to North Africa. The Maghribi traders retained some distinct self-identity,<sup>174</sup> but did not establish a separate community apart from the Jewish communities in which they lived.<sup>175</sup> They made use of the Jewish community's enforcement mechanisms.<sup>176</sup>

In contrast, Karen Clay's description of trade in Mexican California in the 1830s indicates a mix of traders from various European countries, or of European or European-Native American descent.<sup>177</sup> While British and American traders seemed to be more dominant than others, and while many of them converted to Catholicism and became Mexican citizens,<sup>178</sup> diversity among the merchant population was too great to allow a strong sense of community.<sup>179</sup> Furthermore, most merchants held significant market power; in

174. Greif writes:

Although the Maghribi immigrants integrated into existing Jewish communities, they also retained a strong sense of identity and solidarity among themselves. . . . In 1030 a letter from Fustat to the head of the yeshiva in Jerusalem happily reports that some Maghribis have joined the Fustat yeshiva's synagogue. Twenty-four years later, in a report sent to Jerusalem concerning the condition of that synagogue, the "Maghribi people" are still mentioned as a separate group.

Greif, *supra* note 9, at 862.

175. *Id.* ("It is important to note that the Maghribi traders did not establish a separate religious-ethnic community apart from the Jewish community. Nor did they represent a 'natural' group, which binds together individuals in all (or at least most) important aspects of their lives.").

176. *Id.* at 862-63 ("Indeed, when a Maghribi trader wanted to impose social sanctions against another trader, he made a public appeal to the Jewish communities.").

177. See Clay, *supra* note 9, at 204-07.

178. *Id.* at 206.

179. One possible explanation for the failure of a common religion to bind the merchants and ensure their honesty is that in this particular case it seems that conversion to Catholicism was a necessity for a non-Catholic to settle in the area. As a result, many converted opportunistically, and had little true affiliation with the religion. Thus, the religious institutions may not have had much power over some of their half-hearted flock. In addition, Catholicism was ubiquitous in the region. While social and religious networks have network effects (positive returns to scale of membership), network effects are not infinite. There is a gradual dilution in the binding power of a social or religious network as it expands. The flip side of this phenomenon is that exclusion of a group from the larger community facilitates adherence of the group members to the group's norms. On this point, applied to cartel enforcement (which is a group norm), see Bruce H. Kobayashi, *Antitrust, Agency, and Amnesty: An Economic Analysis of the Criminal Enforcement of the Antitrust Laws Against Corporations*, 69 GEO. WASH. L. REV. 715, 742 (2001) (arguing that high antitrust penalties may deter defection from cartels). An interesting ancillary aspect is that some exclusions of sub-groups, which result in restricting competition between members of the sub-group and members of the larger community, may serve to bond individuals from the sub-group with individuals from the larger community. See, e.g., Yoram Barzel, *Confiscation by the Ruler: The Rise and Fall of Jewish Lending in the Middle Ages*, 35 J.L. & ECON. 1, 3-4, 10 (1992) (discussing how restrictions preventing Jews in medieval England from engaging in any occupation other than financing (which Christians were prohibited from doing), as well

many towns there were few active merchants, and sometimes a town contained only a single merchant.<sup>180</sup> The difference in the effectiveness of the enforcement mechanisms was significant. While the traders in Mexican California exchanged information on dishonest colleagues, they very rarely succeeded in imposing collective punishment. The Maghribi traders, on the other hand, used collective punishment much more frequently.<sup>181</sup> These different outcomes again seem to support this Article's theory: The Maghribi traders described in Greif's paper, able to tap a preexisting network that regulated a low-enforcement-cost norm, could regulate the high-enforcement-cost norm of proscribing opportunism with effective measures such as collective exclusion of dishonest agents. On the other hand, the Mexican traders discussed in Clay's paper did not have a preexisting network, enforcing low-cost norms, that governed all of them, and as a result, could not enforce collective exclusion, using instead the less powerful (but still helpful) information mechanism.<sup>182</sup>

The significant enforcement advantage of an exclusion mechanism over an information mechanism is demonstrated in Greif, Milgrom and Weingast's examination of the evolution of merchant guilds in medieval Europe.<sup>183</sup> They describe the difficulties German merchants had in securing commitments from the rulers of foreign trade centers to protect them and their property while in the trade center. The foreign rulers had a strong incentive to promise protection, in order to attract foreign commerce. However, once the traders made an investment and brought their property to the foreign town, their goods became an attractive target for confiscation, and their protection was quite costly. As a result, rulers often reneged on their vows to protect foreign traders.

One way to protect the traders was for their government to threaten the

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as rules regulating the attire and residence of Jews, allowed Jewish lenders to effectively bond themselves to Christian borrowers and be privy to sensitive business information that was needed to assess the loan's risk).

180. Greif, *supra* note 9, at 214 ("While the Maghribi traders moved their business easily from one merchant in a port to one of the several other merchants in the port, at most a few California merchants or, in some cases, only one were active in each town.").

181. Greif discusses this point as follows:

The striking thing about the merchant coalition in California is the infrequent use of collective punishment. The other context in which we observe a merchant coalition is the western Mediterranean during the eleventh century (Greif, 1989, 1993). In both cases, disputes between principals and agents inevitably arose because of imperfections in the information network and contingencies not specified in the implicit or explicit contract. In the western Mediterranean, however, the Maghribi traders used collective punishment more frequently in the course of their interactions.

*Id.*

182. As Clay's paper demonstrates, an information mechanism can exist even absent a preexisting network that regulates low-enforcement-cost norms. Nonetheless, the information mechanism can be more effective if such a preexisting network is in place. Without it, merchants might under-invest in collecting and transmitting to other merchants information on agents' honesty, because they will fail to internalize all of the utility derived by other merchants from the transmission of this information.

183. See Greif et al., *supra* note 13, at 758-62.

foreign ruler with military responses to harm visited upon the merchants in the ruler's territory. But in the high Middle Ages defense (such as castles) was more powerful than offense, and therefore attacking a fortified rival was a costly affair.<sup>184</sup> Also, as Greif notes, "in the age prior to the emergence of the nation-state, alien merchants could expect little military or political aid from their countrymen."<sup>185</sup> As a result, the threat of war was not very credible.

Another, more feasible way to protect traders was to credibly threaten the ruler with a merchant boycott of his town. Enforcement of this boycott was crucial, since some merchants either had more to lose from the boycott, or felt more secure, than others. Merchant guilds served to enforce the boycotts. The guilds built on the existing social network of the individual town, and therefore most guilds regulated merchants residing in a given town.<sup>186</sup> Their enforcement powers came both from the town's social network and from the town governance institutions.

The volume of trade in most major Italian cities was sufficient that a guild governing merchants of a single town could deter a foreign ruler from reneging on a promise to protect the merchants. Not so for the German towns. Since each town's volume of trade was relatively small compared to that of the towns of other nations,<sup>187</sup> the German towns could not individually coordinate a sufficient sanction to discipline foreign rulers. Thus, the German merchants tried to coordinate by forming Kontore (singular Kontor)—offices in the foreign cities that represented and coordinated the actions of merchants of all German towns.<sup>188</sup> However, the Kontore were not based on a low-cost enforcer such as a tight social network; the social network containing all German merchants was much weaker than the social network containing the merchants in a given town. Being disconnected from the social networks of the individual towns, the Kontore could not impose sanctions on merchants in the towns in

184. *Id.* at 751 ("Military action might seem another important alternative. In the late medieval period, however, defensive technology was superior to offensive technology, and the costs and risks of offensive military action at distant ports limit its credibility as a sanction for trade violations.").

185. *Id.* at 747.

186. *See, e.g., id.* at 755. Greif, Milgrom and Weingast write:

The core of a merchant guild was an administrative body that supervised the overseas operation of merchant residents of a specific territorial area and held certain regulatory powers within that territorial area. In England, for example, the merchants of a town were granted the right to establish a society of merchants that retained specific commercial privileges in the internal and external trade of the town. . . . On the European continent, many towns were controlled by the mercantile elite who organized a merchant guild to advance their interests.

*Id.* Guilds in Italian cities (and some German cities) were not named "guilds." Rather, they were the city administration itself, which undertook the roles assigned to guilds elsewhere. *Id.* ("In some Italian and German towns the merchant guilds were virtually identical with the town's government itself, and in some Italian cities the merchants' operations were supervised by the city.") (internal citations omitted).

187. *Id.* at 761-62 ("And, because none of the [Italian] cities was a 'marginal player' in the ports in which they traded, coordination among the cities was unnecessary . . . . [T]he German towns were small, and before the establishment of the Hansa, most were relatively insignificant in large trading centers such as Bruges.").

188. *Id.* at 759.



which they resided.<sup>189</sup>

As Greif, Milgrom and Weingast describe, this weakness led to the ineffectiveness of the Kontore. In 1280, many foreign guilds, including the German Kontor, declared an embargo of Bruges and moved their trade to Aardenburg in response to Bruges' failure to protect foreign merchants. After two years, Bruges capitulated and agreed to protect the merchants. However, while it respected this agreement in regards to the rights of some merchants, it ignored the agreement in its treatment of German merchants.<sup>190</sup> Bruges realized that the Kontor lacked sufficient enforcement power; it lacked any control over German merchants not present in Bruges, and could not enforce its decisions in the hometowns of the German merchants. Therefore, while Bruges had to yield to the embargo of the more effective Spanish and Italian merchant organizations, it was not intimidated by the Kontor, and thus reneged on its agreement with the Kontor.<sup>191</sup>

Following this failure, the German towns realized that in order to form an effective regulator of merchant operations they had to build on the foundations of the low-cost social network. But as these networks were too small to have a sufficient effect on the foreign rulers, they created a network of (social) networks, expanding the social and political network to encompass the more important German mercantile towns. This new social and political institution was known as the Hanseatic League.<sup>192</sup> Though it initially dealt with matters of governance within the towns, it quickly expanded to control the merchants' affairs abroad. Initially, there was some friction between this social network and the older, town-based network. Thus, when an embargo was declared on Norway in 1284, merchants from the city of Bremen refused to cooperate. The network between the other German towns was by then strong enough, however, that they excluded Bremen's merchants from the all the German Kontore.<sup>193</sup> By 1307, the Hanseatic League had evolved to successfully regulate merchant behavior of all its members. In that year it had again declared an embargo on Bruges, this time acting on its own (without participation of other foreign merchants). After a two year boycott Bruges conceded, and this time, facing effective coordination of the German merchants, honored its commitments.<sup>194</sup>

This case study supports the theory of non-spontaneous evolution. The first

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189. *Id.*

190. *Id.* ("Seemingly successful, the embargo failed to guarantee the property rights of the German merchants, since Bruges simply ignored its agreement with them. It should be noted, however, that Bruges did respect the rights of other alien merchants who frequented the city.") (internal citation omitted).

191. *Id.* at 760.

192. *Id.* at 760-61. A set of alliances between some of the German mercantile towns created the Hanseatic League. See, e.g., Agreement Between Hamburg and Lubeck for Protection (1241), at <http://www.fordham.edu/halsall/source/1241lubeckhamburg.html>.

193. See *id.* at 760.

194. *Id.*

part of the story—an attempt to enforce an embargo by spontaneously formed Kontore that were not based on lower-cost foundations—supports the argument that the paradox of spontaneous formation is likely to doom all but low-enforcement-cost networks to fail, or at most to be limited in effectiveness. Enforcing an embargo, like enforcing a cartel, or restricting warfare, is either a Prisoner's Dilemma<sup>195</sup> or a Stag Hunt<sup>196</sup> norm. These higher-enforcement-cost norms can only rarely, in very favorable market structures, survive spontaneous formation. Typically, to be sustained they require strong enforcement mechanisms, typically from a network that has already evolved to enforce other, less costly norms.

It seems that this is precisely what happened in this case study. Initially, no preexisting network governed the German towns, so there was no network that could evolve to enforce a collective boycott that would force foreign trade centers to protect the German merchants. Absent a low-enforcement-cost foundation, attempts to enforce a collective boycott repeatedly failed. The formation of the Hanseatic League provided this foundation, and in accordance with this Article's theory this foundation expanded from a network of social and political sub-networks to a regulator of merchants' behavior outside of the League's territory.

## V. NORMATIVE APPLICATIONS AND CONCLUSION

While this Article aims to illuminate an oft-neglected aspect of private ordering literature—the evolution of PLSs' enforcement mechanisms—it also provides a foundation for some normative analysis. I will briefly suggest three applications of this theory, in the fields of antitrust, critical infrastructure protection, and corporate governance. A summary and conclusion will follow.

### A. Normative Application: Antitrust

Several fields of law, in particular antitrust and the laws regulating network

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195. It is a Prisoner's Dilemma type of norm if the preference order for each player is: (1) the player is allowed to sell despite the embargo (or sell below the cartel price, or fight unrestricted) while others abide to the embargo (or the cartel pricing, or the warfare restrictions); (2) both the player and everyone else abides by the embargo, cartel, or warfare restrictions; (3) neither the player nor anyone else is restricted by the embargo, cartel, or warfare restrictions; (4) the player abides by the restrictions, but others do not.

196. It is a Stag Hunt norm if the player benefits more from an ordered world in which everyone follows the constraints than from ignoring the constraints while others abide by them. For example, if an individual merchant disobeying an embargo can reap supercompetitive gains, but by her actions prevents the embargo from being successful and thus does not receive protection from the foreign ruler while in a foreign market, the lack of protection might outweigh the supercompetitive gains, and she might prefer mutual abidance to the embargo over profiting from breaking it. However, despite this preference she would disobey the embargo (and gain profits from it) if she thought someone else is likely to disobey the embargo and cause it to fail. This preference order is characteristic of the Stag Hunt game. See *supra* Section III.D.

industries (exchanges, commerce, the internet, telecommunications, energy, etc.), are predisposed to suspect private networks' attempts to regulate behavior.<sup>197</sup> It is of little wonder that they do; the ability to regulate behavior is sometimes used by a network to enforce a cartel, rather than socially beneficial behavior. But policing a cartel is a Prisoner's Dilemma game—an expensive game to enforce. Other, social-welfare-enhancing forms of regulation often involve norms characterized by less costly game types—Stag Hunt, Battle of the Sexes, or even Meeting Place. Where a network's enforcement powers are limited, it may opt to evolve into regulating less costly aspects of behavior, rather than expensive cartel policing.<sup>198</sup>

While the evolutionary pattern described in this Article suggests that a spontaneously formed cartel would not be stable under most circumstances, it also proposes that cartels may be stable if they make use of the enforcement mechanisms of lower-cost (and hence more stable) norms (e.g., those facilitating tight social or religious networks, exchanges or trade associations, etc.). The analysis of the potential for coordinated effects should thus shift some of its focus from the market structure in which the suspected cartel may form to the market structure and characteristics of the lower enforcement cost networks that may evolve into policing a cartel.

By understanding how PLSs evolve, public law will have better tools to assess the likelihood that a network will evolve into an anticompetitive cartel or a socially beneficial PLS.

### *B. Normative Application: Critical Infrastructure Protection*

Even before the tragic events of September 11, 2001, increased the public's sensitivity to homeland security, policymakers realized the need to enhance protection of critical infrastructure (such as financial, communications, energy, and transportation networks, water distribution systems, etc.). Following a report by the Presidential Commission on Critical Infrastructure Protection, President Clinton issued in 1998 Presidential Decision Directive (PDD) 63,<sup>199</sup> which aimed at enhancing protection not only of government-owned or controlled critical infrastructure, but also of those facilities controlled or owned by the private sector (which, in some critical infrastructure sectors, are the

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197. For a critique of antitrust law's suspicion of private ordering, see Frank H. Easterbrook, *The Limits of Antitrust*, 63 TEX. L. REV. 1, 1-14 (1984).

198. See Bryan Caplan & Edward Stringham, *Networks, Anarcho-Capitalism, and the Paradox of Cooperation* (May 2001) (unpublished manuscript on file with the *Review of Austrian Economics*), available at <http://www.gmu.edu/departments/economics/bcaplan/network2.doc>.

199. Presidential Decision Directive 63 itself is classified. For a description of its contents, see CRITICAL INFRASTRUCTURE ASSURANCE OFFICE, THE CLINTON ADMINISTRATION'S POLICY ON CRITICAL INFRASTRUCTURE PROTECTION: PRESIDENTIAL DECISION DIRECTIVE 63 (1998), available at <http://www.ciao.gov/resource/paper598.html>.

majority of facilities).<sup>200</sup>

PDD 63 recognized a need for information sharing among private firms (in addition to information sharing between private firms and the government), in order to enhance both detection of attacks and coordination of defenses. It encouraged the development of Information Sharing and Analysis Centers (ISACs), which were to serve as “mechanism[s] for gathering, analyzing, appropriately sanitizing and disseminating private sector information to both industry and the [National Infrastructure Protection Center].”<sup>201</sup> Though it envisioned the role of ISACs, PDD 63 did not determine criteria for their structure and membership.<sup>202</sup>

One example of an ISAC is the Energy ISAC. The Energy ISAC provides a near-real-time threat and warning capability to the energy industry. . . . Members voluntarily report information to the database either anonymously or on an attributed basis. Input is analyzed by security specialists for potential solutions; depending upon the seriousness of the case, the Energy ISAC will distribute an alert to members.<sup>203</sup>

Membership in the ISAC is voluntary, and open to “[c]ompanies in the oil, natural gas, and electric power industries. . . . Relevant energy activities include exploration, production, processing, transmission, distribution, transportation, storage, trading, supervisory control and data acquisition (SCADA), and e-commerce of energy commodities.”<sup>204</sup>

To date, twelve ISACs are in operation, enjoying mixed success.<sup>205</sup> It seems that ISAC members are reluctant to share information freely, and they cite three causes for this reluctance: (1) fear of increased liability due to the disclosure of information on vulnerabilities and specific incidents of attack; (2) risk of antitrust violations resulting from the information exchange; and (3) loss of proprietary information, primarily through use of the Freedom of Information Act to access information disclosed to the ISAC and through it to the government.<sup>206</sup> Some have viewed these concerns as not substantial enough

200. Peter Lichtenbaum & Melanie Schneck, *The Response to Cyberattacks: Balancing Security and Cost*, 36 INT’L LAW. 39, 41 (2002).

201. CRITICAL INFRASTRUCTURE ASSURANCE OFFICE, *supra* note 199.

202. *Id.* (“The actual design and functions of the center and its relation to the NIPC will be determined by the private sector, in consultation with and with assistance from the Federal Government.”).

203. Energy ISAC Frequently Asked Questions, at <http://www.energyisac.com/faq.cfm>. The ISAC provides its members with:

A wide range of information on threats and vulnerabilities (physical, cyber-security, and interdependencies); early notification of physical and cyber-threats; possible responses to those threats (e.g., information technology solutions and patches, and physical and information security tips); alert conditions; best practices [guidelines]; and a forum for members to communicate in a secure environment. *Id.*

204. *Id.* See also Energy ISAC Subscriber Agreement, at <http://www.energyisac.com/docs/local/subscriberagreement.pdf>.

205. John McCarthy, *Focus on Information Sharing*, 1 CIP REP. (CIP Project, Arlington, Va.), Feb. 2003, at 4.

206. Emily Frye, *The Tragedy of the Cybercommons: Overcoming Fundamental Vulnerabilities to*

to explain the limited information exchange that takes place.<sup>207</sup> Furthermore, Congress is considering a bill that would provide exemptions from antitrust laws and the Freedom of Information Act likely to cover most information sharing done through an ISAC.<sup>208</sup>

There may be other reasons for the limited information sharing activity among ISAC members. Collecting information has significant fixed costs and very low variable costs of dissemination and use by others. Absent some form of enforcement, each ISAC member faces a Prisoner's Dilemma game in deciding whether to collect and share information or not: If the others are providing her with information, she would be better off receiving the information but expending no costs in reciprocating. If others—making the same calculation—fail to share information with her, she would still be better off not sharing information with the others. Thus, all parties shirk, and no information is shared.

When the contemplated information exchange is made among competitors, as is the case in most ISACs, an additional concern reduces information sharing further. Since withholding information from a competitor gives the ISAC member an edge in competing with her rival, there is a significant hidden cost in sharing the information: tougher competition from the now more knowledgeable (and thus more effective) rivals.<sup>209</sup> The information (e.g., a report of an attack that harmed a company's computer network) may also be leaked to the media by rivals, damaging the reporting company's reputation. Again, this is a Prisoner's Dilemma game, in which (absent public or private enforcement) each ISAC member would refrain from providing information whether she expects her rival to provide her with information or not.

The key to overcoming these barriers is, as I alluded to earlier, effective enforcement. Under an assumption that PLSs form spontaneously, one would expect every ISAC to police its members and ensure that they share information. But as this Article has demonstrated, PLSs regulating high-enforcement-cost norms do not form spontaneously. They evolve from preexisting PLSs that regulate lower-cost norms of the same parties involved in the high-enforcement-cost norm.

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*Critical Infrastructures in a Networked World*, 58 BUS. LAW. 349, 374-75 (2002).

207. See, e.g., *id.* at 374 (arguing that fear of increased liability is unfounded if all firms provide information); Emily Frye, *Information-Sharing Hangups: Is Antitrust Just a Cover?*, 1 CIP REP. (CIP Project, Arlington, Va.), Feb. 2003, at 6-7 (arguing that antitrust liability is unlikely in most circumstances, and that a better explanation for the limited information-sharing is lack of trust among ISAC members).

208. The proposed bill is the Cyber Security Information Act, H.R. 2435, 107th Cong. (2001). On the bill, see Lichtenbaum & Schneck, *supra* note 200, at 45-46.

209. For a more thorough analysis of this impediment to information sharing, see Amitai Aviram & Avishalom Tor, *Overcoming Impediments to Information Sharing* (Aug. 2003) (unpublished manuscript on file with author), available at [http://papers.ssrn.com/sol3/delivery.cfm/SSRN\\_ID435600\\_code030815570.pdf](http://papers.ssrn.com/sol3/delivery.cfm/SSRN_ID435600_code030815570.pdf).

Thus, an ISAC is unlikely to succeed in regulating information sharing unless it relies on a preexisting system that governed the same parties that now require enforcement of efficient information sharing. Facilitating this reliance on preexisting systems may be a consideration in determining ISAC membership: In order to overcome barriers to information exchange and function effectively, ISAC membership needs to be similar to the membership of a preexisting low-cost regulator (such as a tight social or commercial network). As we have seen earlier, in such cases, the social or commercial network is likely to assume the responsibility of ensuring that its members share information with each other despite incentives to shirk.

Currently, ISACs are delineated by industry.<sup>210</sup> The industry categories are very broadly defined, which may result in over-inclusion (i.e., including firms that are in the same industry but do not transact much with most other members and do not share membership in a low-enforcement-cost regulator), as well as under-inclusion (i.e., omitting firms that are not within the same industry, but transact frequently with ISAC members and are members of the same low-enforcement-cost regulator).

For example, even if there is a single trade association encompassing all firms in a sector such as “the food industry” or “the information technology industry,” these sectors involve so many differently situated firms that smaller commercial and social networks are likely to be more significant in individual firms’ transactions and in the lives of these firms’ managers. At the same time, these preexisting networks might encompass others not in the industry, but with which the firm frequently transacts and would benefit from sharing information with. By adding these out-of-sector firms into the ISAC, and splitting current ISACs into groups that share tight social or commercial networks, ISACs should be able to increase information sharing.<sup>211</sup>

The key to delineating the correct membership in an ISAC is identifying a group of firms that (1) are interdependent on each other’s facility security (and therefore benefit from the information exchange within the ISAC), such as utility companies that are connected to the same power grid; and (2) are also members of a preexisting network that provides its members with some significant benefits. While this network could be a social network, it is unlikely that any social network would predominantly consist of the interdependent firms; more likely, an appropriate preexisting network would be a business

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210. Existing ISACs include: Financial Services, Chemicals Industry, Electric Power, Emergency Fire Services, Emergency Law Enforcement, Food, Information Technology, Interstate, Oil & Gas, Surface Transportation, Telecommunications and Water Supply. McCarthy, *supra* note 205, at 4 (2003).

211. Information sharing between these smaller ISACs is possible even if they are not within the same network, by having a secondary network of networks, in which members from each ISAC, acting as hubs of information, would share information with their counterparts from other ISACs. Of course, to be effective, these hubs need to be members of a low-enforcement-cost regulator themselves, and the selection of the firm that should serve as a hub in each ISAC should take that into account.

network (e.g., companies that frequently buy or sell from each other). The close and repeated business connections may serve as a preexisting foundation that would prompt each firm to be more forthcoming with information it possesses regarding its critical infrastructure security.

Of course, the suitable type of preexisting network is highly dependent on case-specific details. This Article can only give guidelines as to the characteristics of an effective network. It shifts the focus to identifying a preexisting, effective social or commercial network that may serve as an enforcer of efficient information sharing. The more the ISAC membership resembles the membership of this preexisting network, the lower the barriers will be to efficient information sharing. A sector-wide membership criterion for ISACs, which seems to be the current standard, may not be conducive to efficient self-enforcement of information sharing.<sup>212</sup>

This analysis may become especially important if the bill exempting ISAC members from antitrust laws and FOIA is enacted.<sup>213</sup> Any exemption from these laws carries a social cost that may be offset by a redeeming benefit—in this case, the enhanced protection of critical infrastructure. But for this tradeoff to be socially beneficial, the protected ISAC must achieve this redeeming benefit; that is, it must be able to effectively facilitate information sharing. To do that it must enforce on its members their commitment to report information they have. Such self-regulation is unlikely to form spontaneously, but may occur if the ISAC membership is designed to take advantage of the regulatory abilities of preexisting PLSs.

### *C. Normative Application: Corporate Governance*

A series of financial scandals in conspicuous American businesses<sup>214</sup> has shaken public trust in business and made some question the ability of corporations, under current structure and law, to ensure that managers act to maximize the profits of shareholders (rather than the managers' own interests).<sup>215</sup> This concern has spurred legislation and regulatory action that imposed on managers complex procedures designed to foster more

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212. A sector-wide membership criterion may also not be optimal from the perspective of the information exchange that is facilitated. It is possible that to protect critical infrastructure, information need not be shared with all members of an industry, but only with a smaller group of firms whose facilities' security is interdependent on each other. This group may even include firms that are not within the same industry (e.g., suppliers, customers), while not including some rivals with which the firm has little interaction.

213. See *supra* note 208.

214. For a summary of the Enron scandal, which is possibly the scandal that has received the most public attention, see, for example, Note, *The Good, the Bad, and Their Corporate Code of Ethics: Enron, Sarbanes-Oxley, and the Problem with Legislating Good Behavior*, 116 HARV. L. REV. 2123, 2128-30 (2003).

215. See Robert W. Hamilton, *The Crisis in Corporate Governance: 2002 Style*, 40 Hous. L. REV. 1, 35-40 (2003).

accountability to shareholders, most notably the Sarbanes-Oxley Act of 2002.<sup>216</sup>

Both corporation law (which is predominantly state law) and securities law (which is predominantly federal law) accept as their baseline the freedom of parties to design a corporation and its capital structure in any way they see fit. The laws do not prevent a party from agreeing to risky or even downright foolish terms. State corporate laws tend to leave corporate governance arrangements to private ordering, assuming the people forming the corporation will design the optimal arrangements for that firm. Delaware law, for example, places most powers and responsibilities in the hands of the board of directors, subject to a fiduciary duty that is examined *ex post*.<sup>217</sup> Indeed, many firms have devised arrangements deviating from the default rules on corporate governance, such as requiring outside directors.<sup>218</sup>

Federal securities laws, which apply to firms that have made public offerings of their securities, take a more intrusive, though not unrestrained, role in affecting corporate governance.<sup>219</sup> Even prior to the Sarbanes-Oxley Act, securities laws imposed extensive disclosure requirements on management. The Sarbanes-Oxley Act and new SEC rules have expanded the scope of intervention further.

Behind the increased intervention lies the belief that current laws and existing private enforcement (whether through privately designed governance structures or through personal morality of managers) are insufficient to eliminate the incentives managers have to advance their interests at the expense of those of shareholders. But this intervention is not without costs. First, there are costs expended in complying with the requirements. Second, tighter regulation might preclude, by making them too cumbersome or litigation-prone, certain actions directors might take to increase shareholder value. Opponents of government intervention note that intervention replaces

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216. Sarbanes-Oxley Act of 2002, Pub. L. No. 107-204, 116 Stat. 745 (to be codified in scattered sections of 11, 15, 18, 28 & 29 U.S.C.). On the legislative and regulatory responses to the series of scandals, see Robert B. Thompson, *Corporate Governance After Enron*, 40 HOUS. L. REV. 99, 100-07 (2003).

217. See Thompson, *supra* note 216, at 108-09. As an exception to this principle, there are some actions that require shareholder votes, such as director elections, approval of mergers and similar transactions, or cleansing board decisions when board members have conflicts of interest. *Id.*

218. See *id.* at 109.

219. The federal government's involvement in corporate law, mainly through securities regulation, faces limits dictated by federalism. Though federal laws have increasingly affected corporate law, the Supreme Court has maintained that state corporate law cannot be displaced by federal law. See, e.g., *Cort v. Ash*, 422 U.S. 66, 84 (1975) ("Corporations are creatures of state law, and investors commit their funds to corporate directors on the understanding that, except where federal law expressly requires certain responsibilities of directors with respect to stockholders, state law will govern the internal affairs of the corporation."); *Santa Fe Indus., Inc. v. Green*, 430 U.S. 462, 479 (1977) ("Absent a clear indication of congressional intent, we are reluctant to federalize the substantial portion of the law of corporations that deals with transactions in securities, particularly where established state policies of corporate regulation would be overridden.").



shareholders' discretion with government's, even though government is not as familiar as the shareholders with the business and the unique circumstances of a given firm, and does not have the direct incentive shareholders have to maximize their wealth. Some scholars suggest that the impetus for the current wave of corporate governance legislation (and other securities law legislation before it) is not the realization of calculated, thoughtful new insights into corporate governance, but a cyclical emotional response to a market crash that ends a speculative bubble.<sup>220</sup>

Another critique of the government's response to the series of scandals anticipates a different cost resulting from detailed, rule based mandates. According to this critique, such rules may displace the personal morality of managers, who will feel that following the government's directives absolves them of additional moral considerations.<sup>221</sup> Following that line of thought, the increase in government regulation may be offset by a decrease in self-regulation,<sup>222</sup> leaving the utility of shareholders unimproved or worse.

Generally, the lower the regulatory abilities (or incentives) of non-government entities, the more beneficial government regulation would be for shareholders. This Article suggests that, in assessing the abilities of private regulators, attention should be given to the availability of a preexisting low-enforcement-cost regulator. In this application, two separate regulators need to be considered: potentially misbehaving managers, and the shareholders who are the victims of such misbehavior.

First, the potential malfasants. Usually, a single manager cannot succeed in his misbehavior without the cooperation (or at least acquiescence) of one or more other managers. Each manager incorporated into the scheme can either go along with it or blow the whistle. This is a Stag Hunt game: if the others go along, the manager would want to go along with the scheme as well (and reap the profits of the misbehavior). If the others blow the whistle, so should the manager (in order to mitigate or avoid punishment for the discovered scheme). But among those two options, the manager would prefer that both he and the others go along with the plan, rather than both he and the others blow the whistle (or scrap the plans). The Stag Hunt game is one of moderate enforcement costs—a regulator of such a game (i.e., an entity that ensures that no one blows the whistle) is unlikely to evolve spontaneously, but the norm is cooperative enough that even a weak preexisting regulator (e.g., an “old boys

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220. See Larry E. Ribstein, *Bubble Laws*, 40 HOUS. L. REV. 77 (2003).

221. See Lawrence E. Mitchell, *Cooperation and Constraint in the Modern Corporation: An Inquiry into the Causes of Corporate Immorality*, 73 TEX. L. REV. 477 (1995) (arguing that increased rule-based regulation weakens corporate morality).

222. “Self-regulation,” as used here, refers to personal morality (regulation by the self), not the broader “private regulation,” which encompasses regulation by anyone but government (e.g., the self, other shareholders, gatekeepers, etc.). See Aviram, *supra* note 8, at 8-14 (defining self-regulation and other types of private regulation).

club” to which the managers belong) may create sufficient assurance that no one will blow the whistle for all the managers to feel confident about cooperating in the misbehavior.

So, if the managers who are in position to know about an attempted misbehavior belong to some preexisting low-enforcement-cost network (such as a social network formed by living, studying or working together for a long time), a higher likelihood of managerial misbehavior may be anticipated (because those managers are less likely to blow the whistle). Since it does not take as much coercion to facilitate cooperation in a Stag Hunt game as it does to facilitate cooperation in a Prisoner’s Dilemma game, the coercive power a network would need in order to deter managers from reporting their colleagues’ misbehavior need not be as great as it would have to be if the network had to enforce, say, an anti-opportunism norm (which is a Prisoner’s Dilemma game).

The second regulator that needs to be considered, who has an opposite goal of preventing the misbehavior, is the victim of the managerial misbehavior—the shareholders. If both the managers and the shareholders are part of the same PLS that regulates low-enforcement-cost norms—for example, if the managers and the shareholders are part of the same core social network (perhaps all are members of the same small community)—then regulation by this group is likely to be successful (e.g., the managers, fearing loss of their social capital if their fraud is detected, will not attempt it). But if the managers are not part of the shareholders’ low-enforcement-cost network, the best the shareholders can do is to use the preexisting network to detect managers’ misbehavior, and leave punishment—through private and public suits—to the public legal system. This, of course, results in a more limited ability of the shareholders to deter managerial misbehavior. Even this modest attempt at self-policing is unlikely to be feasible in many publicly-owned companies, whose shares are held by a diverse group of shareholders that may not share any common networks, be they social, religious, business or other, and thus may find it hard to coordinate in policing the company’s executives.

In summary, assessing the risk of managerial misbehavior and the abilities of private regulation of managers requires examination of: (1) whether the managers who are likely to know of managerial misbehavior (and possibly benefit from it) are members in a low-enforcement-cost network that would allow them to overcome the Stag Hunt game and cooperate in the misbehavior (if so, the risk of misbehavior is higher); (2) whether the managers that are likely to know of managerial misbehavior are members of the same low-enforcement-cost network as the shareholders (if so, private regulation of managerial misbehavior is likely to be effective); and (3) whether the majority of shareholders are members of the same low-enforcement-cost network (if so, collective action problems impeding the detection of misbehavior would be reduced, but government involvement in punishing the detected misbehavior

would still be necessary).

#### D. Conclusion

The private ordering literature has shed a good deal of light on the efficiency of norms enforced by PLSs, the enforcement mechanisms a PLS uses to achieve adherence to those norms, and the evolution of the norms. However, little attention has been paid thus far to the evolution of the enforcement mechanisms themselves, despite calls by some scholars to study this issue.<sup>223</sup> Most scholarship seems to assume, in the spirit of the Coase Theorem, that PLSs form spontaneously (unless impeded by government) when the benefits to the group governed by the legal system exceed the cost of enforcing the system.

As this Article demonstrates, spontaneous formation of PLSs is unsuccessful for all but the lowest-enforcement-cost norms. PLSs formed without the benefit of preexisting enforcement mechanisms suffer from the paradox of spontaneous formation: to efficiently direct behavior they must ensure the cooperation of their members, but the effectiveness of the mechanisms used to secure this cooperation (e.g., the threat of exclusion) depends on the ability to confer benefits to the members—primarily the ability (not yet existing for a spontaneously formed PLS) to efficiently direct behavior.

Decentralized bonding (i.e., bonding not achieved through a centralized, network-based institution—typically bilateral bonds) is unlikely to overcome the paradox of spontaneous formation at the optimal level of intra-network transactions. However, this barrier may be overcome by centralized bonding through an evolutionary process of extending preexisting networks to regulate higher-enforcement-cost norms, making use of the established enforcement mechanisms of the preexisting network.

Enforcement costs of a norm depend on several criteria, most of which are similar to the criteria affecting the stability of a cartel. These criteria include, inter alia, concentration and competition between networks enforcing the norm (or substitutable norms);<sup>224</sup> concentration of power among the people to which the norm applies;<sup>225</sup> the utility conferred by the network to the members;<sup>226</sup> the

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223. See, e.g., Posner, *supra* note 5, at 1743 (1996) ("Let me identify two [problems] that seem most urgent and should provide the basis for future research. First, there is not yet a precise understanding of the way norms work and evolve. . .").

224. Naturally, the more competition among networks and the more similar their sizes (and thus the network effects they confer), the higher the enforcement costs of each network, as renegade members can abandon one network for another without incurring as severe a loss of network effects.

225. The greater the discrepancy in power between members, the more likely some would have credible counter-threats to the network's enforcement mechanisms, and the more likely that more powerful members would have incentives to degrade the network. On degradation, see Aviram, *supra* note 8; Cremer et al., *supra* note 118.

226. That is, the importance of the network's preexisting and newly-undertaken norms to the members. The greater the benefit members derive from a norm, the stronger the enforcement abilities of

degree of divergence among members in the amount of utility derived from the norm;<sup>227</sup> and the norm's game type.<sup>228</sup> The criterion of game type has not been explored at all in the literature on cartel stability, because cartels are of a single game type (Prisoner's Dilemma). This Article therefore examined expansively the effects of game types on enforcement costs.

The evolutionary pattern described in this Article usually begins with the spontaneous formation and survival of networks regulating low-enforcement-cost norms (while networks regulating higher-enforcement-cost norms fail). These successful networks enforce norms facilitating social and spiritual utility.<sup>229</sup> After establishing themselves, these networks have enforcement mechanisms capable of regulating higher-enforcement-cost norms such as those facilitating exchanges and creating markets.<sup>230</sup> Upon successful enforcement of these more expensive (but also very beneficial) norms, the network's enforcement mechanisms are augmented, and the network can expand again to yet more expensive norms (such as mitigating opportunism).<sup>231</sup> This gradual expansion of scope, following a progression in the effectiveness of the network's enforcement mechanisms, is the non-spontaneous evolutionary process that creates PLSs.

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a network regulating the norm.

227. As mentioned above, *see supra* Section II.C, greater divergence among members' benefits from a norm increases the cost of agreeing on the optimal regulation and increases the risk of degradation by the members who benefit least from the network.

228. A norm's game type is the network members' ranking of preferences between mutual adherence to the norm, mutual violation of the norm, adherence to the norm while others violate it, and violating the norm while others adhere to it.

229. Such norms are usually characterized as Harmony or Meeting Place games, which are the least expensive to enforce. *See supra* Section III.B.

230. Both of which are Battle of the Sexes games. *See supra* Section IV.C.

231. Mitigating opportunism is sometimes a Prisoner's Dilemma game and sometimes a Stag Hunt game. *See supra* Section IV.C.